BBOB 2009: Comparison Tables of All Algorithms on All Noisy Functions

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Abstract: This document presents the results in the form of tables from the Black-Box Optimization Benchmarking (BBOB) workshop of the Genetic and Evolutionary Computation Conference (GECCO), Montreal Canada, 2009. Each table presents the comparative performances of the algorithms submitted to BBOB 2009 on one problem from the noisy function testbed.

Key-words: continuous optimization, benchmarking

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BBOB 2009: Tables de comparaison de tous les algorithmes sur toutes les fonctions bruitées

Résumé : Ce document présente les résultats sous forme de table du workshop Black-Box Optimization Benchmarking (BBOB) de la conférence Genetic and Evolutionary Computation Conference (GECCO), Montréal Canada, 2009. Chaque table présente les performances des algorithmes soumis à BBOB 2009 pour un problème de la suite de fonctions tests bruitées.

Mots-clés : optimisation continue, banc d'essai

This document provides tabular results of the workshop for Black-Box Optimization Benchmarking at GECCO 2009[1]. Twenty-one algorithms have been tested on 30 noisy benchmark functions in dimensions between 2 and 40. A description of the used objective functions can be found in [13, 8]. The experimental set-up is described in [12].

The performance measure provided in the following tables is the expected number of objective function evaluations to reach a given target function value (ERT, expected running time), divided by the respective value for the best algorithm. Consequently, the best (smallest) value is 1 and the value 1 appears in each column at least once. See [12] for details on how ERT is obtained.

List of Tables

[1] see http://coco.gforge.inria.fr/doku.php?id=bbob-2009

Table 1: Running time excess ERT/ERT$_{\text{best}}$ on f_{101} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

101 Sphere moderate Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.50	0.50	0.90	4.0	5.0	5.6	7.2	8.4	10	11	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1.6**	4.9	32	78	119	156	187	253	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**2.0**	**2.6**	5.0	7.4	8.1	8.8	10	12	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**2.0**	4.9	108	149	163	186	167	192	BayEDAcG [9]
BFGS	**1**	**1**	142	249	1939	10146	*14e-2/4e3*	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	3.3	**2.0**	3.9	5.5	5.8	6.3	6.1	**7.2**	(1+1)-CMA-ES [2]
DASA	**1**	**1**	57	33	40	46	49	45	46	51	DASA [17]
DEPSO	**1**	**1**	**2.7**	5.4	20	26	34	34	37	44	DEPSO [11]
EDA-PSO	**1**	**1**	**1.4**	3.9	13	18	22	27	31	59	EDA-PSO [5]
full NEWUOA	**1**	**1**	3.2	**1.3**	**1.4**	**1.4**	**1.1**	**1**	**1**	**1**	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.4**	6.2	22	27	22	19	17	17	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**2.5**	**1.9**	4.0	5.9	6.5	6.6	7.2	8.4	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**2.9**	**1.9**	4.3	6.3	6.2	7.3	7.8	9.2	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**2.4**	5.1	13	22	29	30	27	26	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1.1**	**1.2**	**1.5**	**1.2**	21	206	1214	MCS [15]
(1+1)-ES	**1**	**1**	3.3	**2.3**	3.5	5.2	5.3	**5.9**	**6.0**	7.5	(1+1)-ES [1]
PSO	**1**	**1**	**2.3**	3.6	13	31	52	73	88	126	PSO [6]
PSO_Bounds	**1**	**1**	**2.8**	**2.6**	11	40	113	183	241	325	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1.9**	3.7	34	327	3150	17840	3.13e5	*17e-6/1e6*	Monte Carlo [3]
SNOBFIT	**1**	**1**	**2.0**	**1**	**1**	**1**	**1**	**1.2**	**1.6**	**1.9**	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**2.6**	6.0	14	17	16	15	15	15	VNS (Garcia) [10]

Table 2: Running time excess ERT/ERT$_{\text{best}}$ on f_{102} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

102 Sphere moderate unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.50	0.50	0.90	3.5	5.4	8.3	10	11	12	16	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**2.1**	4.4	20	68	91	124	154	188	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.1**	**2.2**	3.4	4.4	5.0	6.0	7.1	8.1	8.7	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.8**	5.8	9.0	71	98	92	88	77	BayEDAcG [9]
BFGS	**1**	**1**	99	337	1033	*11e-2/4e3*	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**2.4**	**1.9**	**3.0**	3.8	4.3	4.5	4.9	**5.3**	(1+1)-CMA-ES [2]
DASA	**1**	13	70	57	50	43	44	44	44	47	DASA [17]
DEPSO	**1**	**1**	**2.7**	5.0	13	17	24	24	28	34	DEPSO [11]
EDA-PSO	**1**	**1**	**1.7**	3.6	10	12	17	22	27	43	EDA-PSO [5]
full NEWUOA	**1**	**1**	4.0	**1.7**	**1.5**	**1.0**	**1**	**1**	**1**	**1**	full NEWUOA [22]
GLOBAL	**1**	**1**	**2.8**	5.0	18	18	17	15	13	11	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**2.7**	3.3	4.1	4.3	4.8	5.5	6.0	6.7	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	5.3	3.2	4.9	5.8	6.2	6.6	6.8	7.5	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**2.4**	5.8	11	15	21	22	21	19	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1.2**	**1.1**	**1.2**	**1.4**	197	349	3574	MCS [15]
(1+1)-ES	**1**	**1**	**2.2**	**2.3**	3.2	3.2	4.0	**4.4**	**4.9**	5.4	(1+1)-ES [1]
PSO	**1**	**1**	**3.0**	**2.9**	11	19	40	50	64	90	PSO [6]
PSO_Bounds	**1**	**1.1**	3.2	6.5	14	32	82	144	182	243	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**2.0**	4.5	25	142	3105	11406	2.62e5	*12e-6/1e6*	Monte Carlo [3]
SNOBFIT	**1**	**1**	**2.0**	**1**	**1**	**1**	**1.4**	**1.7**	**4.5**	**4.3**	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**2.6**	7.0	12	12	12	11	12	12	VNS (Garcia) [10]

Table 3: Running time excess ERT/ERT$_{\text{best}}$ on f_{103} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

103 Sphere moderate Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.50	0.50	0.90	3.9	4.7	4.7	4.7	4.9	4.9	6.8	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	3.1	4.6	44	108	191	313	416	6662	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.5**	**2.3**	5.6	7.8	12	16	183	335	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.1**	**2.6**	**2.5**	81	180	194	198	214	266	BayEDAcG [9]
BFGS	**1**	**1**	8.6	3.5	4.5	4.6	4.6	4.4	**4.4**	**3.2**	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**2.1**	**1.7**	4.0	6.0	13	30	77	152	(1+1)-CMA-ES [2]
DASA	**1**	**1**	42	22	37	126	257	1022	3029	18712	DASA [17]
DEPSO	**1**	**1**	**1.6**	**2.7**	13	24	34	62	89	228	DEPSO [11]
EDA-PSO	**1**	**1**	**2.2**	3.4	8.9	20	31	60	195	12992	EDA-PSO [5]
full NEWUOA	**1**	**1**	3.3	**1.5**	**1.5**	**1.6**	**1.6**	**1.6**	**1.7**	**1.2**	full NEWUOA [22]
GLOBAL	**1**	**1**	**2.0**	3.1	23	30	34	33	39	52	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**2.5**	**2.6**	4.1	6.7	9.2	13	231	860	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	4.2	3.3	5.3	7.9	11	14	18	19	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**2.7**	3.8	14	27	47	60	72	63	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1.0**	**1.3**	**1.9**	**1.9**	**1.9**	104	125	MCS [15]
(1+1)-ES	**1**	**1**	**2.1**	**1.5**	4.2	7.2	11	36	78	291	(1+1)-ES [1]
PSO	**1**	**1.1**	3.4	3.4	11	37	102	238	775	28057	PSO [6]
PSO_Bounds	**1**	**1**	**2.5**	3.8	17	55	213	3422	5704	42996	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**2.4**	**3.0**	34	316	3730	31604	3.08e5	*96e-7/1e6*	Monte Carlo [3]
SNOBFIT	**1**	**1**	**2.4**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**2.6**	6.7	14	21	24	26	29	29	VNS (Garcia) [10]

Table 4: Running time excess ERT/ERT$_{\text{best}}$ on f_{104} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

104 Rosenbrock moderate Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.60	2.0	2.7	7.3	97	120	124	126	128	132	ERT$_{\text{best}}$/D
ALPS-GA	**2.3**	3.3	11	20	5.5	11	19	28	38	58	ALPS-GA [14]
AMaLGaM IDEA	**2.9**	3.4	5.8	6.5	**1.1**	**1.3**	**1.6**	**1.8**	**1.9**	**2.2**	AMaLGaM IDEA [4]
BayEDAcG	3.1	**2.8**	5.8	28	32	*12e-2/2e3*	.	.	.	.	BayEDAcG [9]
BFGS	139	105	193	390	218	*60e-2/3e3*	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	4.9	3.7	8.7	12	**1.9**	**2.4**	3.0	3.0	3.2	3.3	(1+1)-CMA-ES [2]
DASA	59	27	89	162	94	129	219	878	2107	43586	DASA [17]
DEPSO	**2.6**	**2.6**	15	19	4.6	6.4	8.4	14	23	*64e-7/2e3*	DEPSO [11]
EDA-PSO	**1.8**	**2.7**	5.8	12	7.1	18	36	51	65	97	EDA-PSO [5]
full NEWUOA	4.9	**2.5**	6.2	10	**1.1**	**1**	**1**	**1**	**1**	**1**	full NEWUOA [22]
GLOBAL	**2.2**	**2.4**	9.0	14	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.5**	GLOBAL [19]
iAMaLGaM IDEA	3.9	**2.6**	**4.1**	**6.1**	**1**	**1.3**	**1.4**	**1.6**	**1.7**	**1.9**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	3.3	**2.1**	4.9	21	7.7	7.7	7.7	7.7	7.7	7.7	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**2.5**	**2.1**	7.7	8.9	**1.9**	**2.6**	3.3	3.4	3.5	3.9	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	5.7	40	80	493	2877	*20e-5/3e4*	MCS [15]
(1+1)-ES	4.8	4.0	5.1	12	**1.8**	10	21	142	241	3027	(1+1)-ES [1]
PSO	**2.2**	**1.9**	5.3	8.2	3.2	5.0	8.1	13	17	28	PSO [6]
PSO_Bounds	**1.9**	3.3	6.6	14	4.5	8.9	27	42	59	87	PSO_Bounds [7]
Monte Carlo	**2.8**	**2.3**	7.0	17	8.6	120	1591	13241	1.13e5	*11e-5/1e6*	Monte Carlo [3]
SNOBFIT	**1.7**	**2.0**	**3.4**	**3.7**	4.5	13	28	50	87	136	SNOBFIT [16]
VNS (Garcia)	10	3.9	8.2	14	**2.3**	**2.3**	**2.5**	**2.6**	**2.7**	3.0	VNS (Garcia) [10]

Table 5: Running time excess ERT/ERT_{best} on f_{105} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

105 Rosenbrock moderate unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT_{best}/D	0.60	2.0	2.7	7.4	178	186	190	195	198	205	ERT_{best}/D
ALPS-GA	**2.2**	**3.0**	4.1	22	3.7	8.0	13	19	26	38	ALPS-GA [14]
AMaLGaM IDEA	**1.4**	**1.7**	5.6	124	5.6	5.8	**5.9**	**5.9**	**6.0**	**6.0**	AMaLGaM IDEA [4]
BayEDAcG	3.9	**2.3**	8.7	29	14	71	*12e-2/2e3*	.	.	.	BayEDAcG [9]
BFGS	64	54	141	337	71	219	*32e-2/3e3*	.	.	.	BFGS [21]
(1+1)-CMA-ES	3.2	**2.2**	11	16	**2.0**	3.9	6.6	**6.7**	**6.7**	**6.6**	(1+1)-CMA-ES [2]
DASA	53	29	93	301	55	104	347	1197	2267	56096	DASA [17]
DEPSO	**2.3**	3.4	5.8	14	**1.5**	**3.3**	**5.8**	7.4	18	147	DEPSO [11]
EDA-PSO	4.3	3.5	6.1	12	**2.0**	8.7	19	29	41	60	EDA-PSO [5]
full NEWUOA	4.8	3.3	4.8	19	**2.7**	8.3	11	14	17	48	full NEWUOA [22]
GLOBAL	3.3	**2.8**	4.7	15	**1**	**1**	**1**	**1**	**1**	**1**	GLOBAL [19]
iAMaLGaM IDEA	**2.7**	**2.4**	**3.2**	24	7.2	8.0	8.0	8.0	8.0	7.9	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	6.0	**2.9**	38	53	6.4	9.3	9.3	9.2	9.1	9.0	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	4.3	3.0	5.9	11	**1.6**	4.7	6.6	8.6	8.7	8.7	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	3.2	26	116	304	*43e-5/3e4*	.	MCS [15]
(1+1)-ES	3.9	**2.3**	10	18	3.1	10	31	82	220	2006	(1+1)-ES [1]
PSO	3.2	**2.5**	4.7	11	**1.8**	**3.6**	6.4	9.1	13	19	PSO [6]
PSO_Bounds	**2.9**	**2.8**	4.9	**8.8**	**2.3**	8.7	19	31	39	52	PSO_Bounds [7]
Monte Carlo	3.7	**2.6**	7.3	32	8.3	68	549	7394	*14e-5/1e6*	.	Monte Carlo [3]
SNOBFIT	**2.3**	**1.8**	**3.1**	**6.1**	**1.6**	5.6	7.6	12	22	34	SNOBFIT [16]
VNS (Garcia)	10	3.9	9.0	13	3.5	8.2	8.2	12	12	14	VNS (Garcia) [10]

Table 6: Running time excess ERT/ERT_{best} on f_{106} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

106 Rosenbrock moderate Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT_{best}/D	0.60	2.0	2.7	7.6	70	140	176	206	245	325	ERT_{best}/D
ALPS-GA	3.2	3.2	10	15	7.2	8.2	14	25	72	1447	ALPS-GA [14]
AMaLGaM IDEA	**2.6**	**1.9**	4.6	**5.8**	16	13	11	11	17	27	AMaLGaM IDEA [4]
BayEDAcG	**2.4**	**2.3**	6.1	31	17	95	161	*66e-3/2e3*	.	.	BayEDAcG [9]
BFGS	16	10	13	13	**2.5**	**2.1**	**1.8**	**1.8**	**1.8**	**1.4**	BFGS [21]
(1+1)-CMA-ES	3.2	**2.5**	5.0	6.4	**1.2**	**1.7**	**3.0**	5.0	6.6	16	(1+1)-CMA-ES [2]
DASA	56	28	96	164	105	165	151	764	3097	*30e-7/8e5*	DASA [17]
DEPSO	4.4	6.0	17	19	5.1	5.6	10	18	40	*11e-5/2e3*	DEPSO [11]
EDA-PSO	3.1	**1.9**	5.0	9.3	5.1	12	19	27	43	1019	EDA-PSO [5]
full NEWUOA	8.8	4.0	5.0	**5.1**	**1**	**1**	**1**	**1.1**	**1**	**1**	full NEWUOA [22]
GLOBAL	**2.2**	3.4	7.4	11	**2.1**	**1.3**	**1.1**	**1**	**1.2**	**1.9**	GLOBAL [19]
iAMaLGaM IDEA	**2.7**	**2.5**	5.2	61	16	17	16	15	20	43	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	4.0	**2.7**	5.2	11	4.4	**2.9**	**2.5**	**2.3**	**2.0**	**1.6**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	4.2	**2.8**	5.7	10	**2.9**	**2.5**	**2.3**	**2.4**	**2.4**	**2.1**	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	8.0	39	76	207	748	*11e-5/3e4*	MCS [15]
(1+1)-ES	5.6	3.8	5.1	10	3.3	8.7	19	90	200	4385	(1+1)-ES [1]
PSO	**2.8**	**1.8**	**3.3**	9.0	4.1	5.0	8.0	37	138	507	PSO [6]
PSO_Bounds	3.3	3.0	10	11	7.3	11	52	66	152	934	PSO_Bounds [7]
Monte Carlo	3.2	**2.2**	6.3	22	20	130	1462	8334	58914	*12e-5/1e6*	Monte Carlo [3]
SNOBFIT	**2.3**	**2.5**	**3.5**	6.9	**2.6**	7.7	12	28	74	*63e-5/3e3*	SNOBFIT [16]
VNS (Garcia)	10	3.9	10	17	3.8	**2.2**	**2.1**	**1.9**	**1.7**	**1.5**	VNS (Garcia) [10]

Table 7: Running time excess ERT/ERT$_{\text{best}}$ on f_{107} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

107 Sphere Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.50	0.50	0.90	6.6	14	57	79	101	128	312	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**2.6**	3.5	12	10	12	15	16	10	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**2.3**	**1.7**	**2.3**	**1**	**1**	**1**	**1**	**1.3**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.1**	**2.4**	**1.2**	**4.0**	4.2	4.4	4.7	4.7	**3.0**	BayEDAcG [9]
BFGS	**1**	**1**	98	109	303	876	659	516	407	*65e-3/4e3*	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	35	7.2	7.7	**2.9**	**2.4**	**2.3**	3.7	4.3	(1+1)-CMA-ES [2]
DASA	**1**	**1**	210	134	332	194	440	551	1407	2772	DASA [17]
DEPSO	**1**	**1**	**2.9**	4.8	6.5	**3.0**	3.8	3.7	3.6	**2.1**	DEPSO [11]
EDA-PSO	**1**	**1.1**	**1.7**	**2.9**	4.9	**2.5**	4.4	6.4	9.3	6.7	EDA-PSO [5]
full NEWUOA	**1**	**1**	12	10	21	6.9	10	18	19	19	full NEWUOA [22]
GLOBAL	**1**	**1.1**	**2.6**	**2.7**	6.9	4.8	4.4	4.0	4.6	5.4	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**2.5**	47	33	8.4	6.2	5.0	11	4.6	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	41	16	8.5	**2.7**	**2.1**	**1.8**	**2.1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**2.3**	**1.6**	4.6	**2.8**	3.8	3.9	4.5	**2.0**	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1**	18	57	168	1384	*86e-6/3e4*	MCS [15]
(1+1)-ES	**1**	**1**	8.2	8.1	8.3	4.3	3.6	3.3	**3.2**	3.1	(1+1)-ES [1]
PSO	**1**	**1**	**2.0**	**2.3**	4.2	3.2	4.9	6.2	7.1	4.6	PSO [6]
PSO_Bounds	**1**	**1**	**1.7**	**2.1**	5.1	5.2	8.5	16	19	13	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**2.1**	**2.8**	13	19	281	2384	17988	47286	Monte Carlo [3]
SNOBFIT	**1**	**1**	**2.1**	**1.1**	6.6	6.6	6.5	6.2	6.4	4.9	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**2.6**	80	42	18	16	12	10	4.2	VNS (Garcia) [10]

Table 8: Running time excess ERT/ERT$_{\text{best}}$ on f_{108} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

108 Sphere unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.50	0.50	0.90	15	101	713	1711	3496	5097	9645	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**2.5**	**1.0**	**1.9**	**1.3**	**1.1**	**1.2**	**1.4**	**1.2**	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.1**	**1.9**	**1.0**	32	6.2	4.3	3.3	4.2	6.1	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	3.1	10	18	18	16	*86e-3/2e3*	.	.	BayEDAcG [9]
BFGS	**1**	**1**	29	6.8	4.2	5.0	7.0	*43e-3/800*	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	55	14	8.8	4.5	11	20	*14e-4/1e4*	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	172	93	88	66	100	224	1632	*99e-6/6e5*	DASA [17]
DEPSO	**1**	**1**	**2.4**	**2.9**	**1.9**	**2.4**	5.4	*26e-4/2e3*	.	.	DEPSO [11]
EDA-PSO	**1**	**1**	**1.9**	**1.1**	**1.7**	**1.0**	**1.2**	**1**	**1.2**	**1.0**	EDA-PSO [5]
full NEWUOA	**1**	**1**	62	53	42	42	*22e-3/7e3*	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.7**	**1.3**	**1.3**	**1.2**	4.8	7.9	*34e-4/2e3*	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**2.5**	48	20	8.0	10	7.9	7.2	6.6	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	601	73	29	6.5	4.5	3.3	3.9	16	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**2.7**	**1**	**1.6**	**1**	**1**	**1.0**	**1**	**1**	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	3.3	**2.8**	5.5	11	104	*43e-5/3e4*	.	MCS [15]
(1+1)-ES	**1**	**1**	36	9.4	9.0	3.4	3.9	11	22	330	(1+1)-ES [1]
PSO	**1**	**1**	**2.4**	**1.1**	**1.3**	**1.3**	**1.9**	**2.4**	**1.9**	**1.5**	PSO [6]
PSO_Bounds	**1**	**1**	**2.7**	**1.1**	**1**	**1.3**	5.6	3.8	3.3	**2.3**	PSO_Bounds [7]
Monte Carlo	**1**	**1**	3.0	**1.3**	**1.8**	**1.7**	8.9	49	349	*17e-6/1e6*	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1.3**	**1.2**	3.6	**2.8**	10	10	*58e-4/3e3*	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**2.6**	46	16	9.4	5.4	**2.8**	**2.2**	3.6	VNS (Garcia) [10]

Table 9: Running time excess ERT/ERT$_{\text{best}}$ on f_{109} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

109 Sphere Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.50	0.50	0.90	4.8	6.3	34	34	48	48	48	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	3.1	4.3	25	11	60	334	2415	74849	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**2.5**	3.0	4.6	14	36	54	103	285	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**2.7**	4.5	12	9.2	13	12	17	28	BayEDAcG [9]
BFGS	**1**	**1**	15	8.3	7.6	**1.4**	**1.4**	**1**	**1**	**1**	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	4.0	**2.5**	9.3	16	61	240	2957	*49e-6/1e4*	(1+1)-CMA-ES [2]
DASA	**1**	**1**	96	207	472	437	5655	42256	1.86e5	*15e-5/6e5*	DASA [17]
DEPSO	**1**	**1**	**2.8**	5.6	18	7.5	13	23	75	*15e-6/2e3*	DEPSO [11]
EDA-PSO	**1**	**1**	**2.3**	3.1	8.8	4.8	45	492	3779	*13e-6/1e5*	EDA-PSO [5]
full NEWUOA	**1**	**1**	4.0	**1.2**	3.3	**1**	**1**	**1.5**	**1.5**	**1.5**	full NEWUOA [22]
GLOBAL	**1**	**1**	**2.1**	**2.7**	18	7.8	12	21	61	*15e-6/2e3*	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**2.8**	**1.8**	**3.0**	13	29	35	101	322	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	3.3	**2.5**	3.8	**1.4**	**2.4**	**2.4**	**3.3**	**4.5**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**2.2**	**2.4**	10	4.5	9.4	11	16	23	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1**	15	35	31	38	87	MCS [15]
(1+1)-ES	**1**	**1**	3.4	**1.8**	4.6	3.1	31	142	854	50142	(1+1)-ES [1]
PSO	**1**	**1**	3.0	**2.5**	12	9.4	511	1103	4655	*17e-6/1e5*	PSO [6]
PSO_Bounds	**1**	**1**	**1.7**	**2.1**	12	229	1507	8500	13675	29299	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**2.5**	**2.7**	23	58	490	2967	66530	*15e-6/1e6*	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1.7**	**1.0**	**2.6**	**1.6**	16	24	39	209	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**2.6**	5.0	11	3.0	4.1	3.8	4.7	6.2	VNS (Garcia) [10]

Table 10: Running time excess ERT/ERT$_{\text{best}}$ on f_{110} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

110 Rosenbrock Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.60	2.2	3.6	17	312	651	1159	2181	4204	4577	ERT$_{\text{best}}$/D
ALPS-GA	**2.8**	**2.0**	6.8	7.1	**1.5**	**2.1**	**2.3**	**1.8**	**1.4**	**2.4**	ALPS-GA [14]
AMaLGaM IDEA	4.2	**2.0**	**4.2**	67	22	16	9.2	4.9	**2.6**	**2.4**	AMaLGaM IDEA [4]
BayEDAcG	**2.4**	**1.7**	5.7	19	10	44	*13e-2/2e3*	.	.	.	BayEDAcG [9]
BFGS	41	34	62	89	43	41	*52e-2/2e3*	.	.	.	BFGS [21]
(1+1)-CMA-ES	3.4	**2.5**	**3.2**	9.3	**1.7**	**2.8**	**2.4**	5.8	5.8	32	(1+1)-CMA-ES [2]
DASA	128	140	151	113	32	47	105	187	268	2085	DASA [17]
DEPSO	**2.2**	**1.6**	11	6.9	**1**	**1**	**1**	**1**	**1.4**	*17e-6/2e3*	DEPSO [11]
EDA-PSO	**2.2**	**1.7**	5.3	6.4	**1.6**	3.2	3.3	**2.9**	**1.9**	**2.6**	EDA-PSO [5]
full NEWUOA	21	17	26	17	**2.8**	8.5	*62e-4/6e3*	.	.	.	full NEWUOA [22]
GLOBAL	**2.7**	**2.0**	4.9	**4.7**	**1.3**	**2.0**	6.1	*10e-3/800*	.	.	GLOBAL [19]
iAMaLGaM IDEA	**2.4**	**1.8**	101	22	9.0	6.6	4.1	**2.5**	**1.4**	**1.3**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	4.3	4.2	4.8	28	4.5	4.4	3.8	**2.1**	**1.1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	3.0	**2.4**	6.1	5.8	**1.2**	**2.1**	**2.2**	**1.8**	**1**	**1.9**	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1.9**	10	93	*18e-4/3e4*	.	.	MCS [15]
(1+1)-ES	3.9	5.9	4.9	6.9	**1.6**	**2.8**	6.4	7.2	10	49	(1+1)-ES [1]
PSO	3.1	**1.9**	5.8	6.6	**1.1**	**1.5**	**1.4**	**1.3**	**1.2**	**1.6**	PSO [6]
PSO_Bounds	**2.9**	**2.1**	7.5	12	**2.0**	**2.8**	3.1	**2.8**	**2.2**	**3.0**	PSO_Bounds [7]
Monte Carlo	3.1	**2.7**	5.5	11	5.9	22	176	656	3560	*65e-6/1e6*	Monte Carlo [3]
SNOBFIT	3.1	**2.4**	5.6	7.8	**2.8**	3.4	5.3	16	*57e-4/3e3*	.	SNOBFIT [16]
VNS (Garcia)	10	3.5	5.9	**5.3**	7.3	9.0	5.5	3.3	**2.3**	3.2	VNS (Garcia) [10]

Table 11: Running time excess ERT/$\mathrm{ERT}_{\mathrm{best}}$ on f_{111} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

111 Rosenbrock unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
$\mathrm{ERT}_{\mathrm{best}}$/D	0.60	3.7	12	59	359	2707	6359	14589	30930	84555	$\mathrm{ERT}_{\mathrm{best}}$/D
ALPS-GA	**2.9**	**1.8**	**1.9**	4.1	**2.7**	**1.1**	**1**	**1**	**1**	**1**	ALPS-GA [14]
AMaLGaM IDEA	**2.5**	**1**	**1**	7.6	8.3	6.3	5.5	5.5	3.2	**2.1**	AMaLGaM IDEA [4]
BayEDAcG	**2.8**	**1.1**	**2.0**	6.4	36	10	*35e-2/2e3*	.	.	.	BayEDAcG [9]
BFGS	7.8	8.4	7.7	8.2	*59e-2/700*	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	4.1	**1.8**	7.4	6.5	4.0	3.6	7.6	10	*64e-4/1e4*	.	(1+1)-CMA-ES [2]
DASA	228	111	124	91	88	39	114	294	*90e-5/6e5*	.	DASA [17]
DEPSO	**1.7**	**2.6**	3.3	5.7	5.7	11	*28e-3/2e3*	.	.	.	DEPSO [11]
EDA-PSO	**2.1**	**1.7**	**1.4**	**2.1**	**2.2**	**1.1**	4.7	5.1	6.4	17	EDA-PSO [5]
full NEWUOA	94	37	26	27	31	35	*15e-2/7e3*	.	.	.	full NEWUOA [22]
GLOBAL	**1.7**	**1.4**	**1.9**	**2.2**	**2.4**	**1.8**	3.5	*54e-3/2e3*	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1.9**	**1.6**	**1.4**	28	21	10	6.2	4.0	3.1	3.1	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	4.6	**1.8**	11	16	7.4	**2.6**	**2.8**	4.8	4.6	*11e-4/1e4*	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	3.4	**1.8**	**1.7**	**1.3**	**2.2**	**1**	**1.2**	**2.1**	**2.2**	*24e-5/1e4*	MA-LS-Chain [18]
MCS	**1**	**2.4**	**1.4**	**1**	4.3	5.5	56	*75e-4/3e4*	.	.	MCS [15]
(1+1)-ES	46	12	14	11	5.6	**2.1**	5.7	10	21	82	(1+1)-ES [1]
PSO	**2.5**	**1.2**	**1.9**	**2.0**	**1**	4.2	4.6	6.4	5.6	8.2	PSO [6]
PSO_Bounds	**2.6**	**1.6**	**1.7**	**1.3**	21	3.2	**2.3**	**2.6**	**2.3**	**1.5**	PSO_Bounds [7]
Monte Carlo	3.9	**1.6**	**1.5**	**2.7**	5.5	4.3	28	131	484	*14e-5/1e6*	Monte Carlo [3]
SNOBFIT	5.0	**2.4**	**2.8**	4.2	10	6.4	5.6	**2.5**	**1.2**	*10e-2/3e3*	SNOBFIT [16]
VNS (Garcia)	10	**2.1**	78	62	22	5.6	4.1	**2.9**	**2.5**	47	VNS (Garcia) [10]

Table 12: Running time excess ERT/ERT$_{\text{best}}$ on f_{112} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

112 Rosenbrock Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.60	2.0	2.7	7.3	312	522	577	618	686	766	ERT$_{\text{best}}$/D
ALPS-GA	**2.3**	**2.9**	9.2	15	**1.6**	3.5	7.6	78	880	47073	ALPS-GA [14]
AMaLGaM IDEA	**2.7**	**1.7**	4.3	64	14	11	26	32	56	91	AMaLGaM IDEA [4]
BayEDAcG	**2.4**	**2.2**	4.5	27	4.8	*88e-3/2e3*	.	.	.	.	BayEDAcG [9]
BFGS	33	27	36	47	3.4	12	16	29	39	*14e-3/4e3*	BFGS [21]
(1+1)-CMA-ES	3.4	**2.0**	4.3	13	**1.9**	**3.0**	13	115	*52e-5/1e4*	.	(1+1)-CMA-ES [2]
DASA	43	23	142	158	26	71	270	3417	*19e-5/7e5*	.	DASA [17]
DEPSO	3.6	4.0	7.4	13	**1.2**	3.8	8.7	*34e-4/2e3*	.	.	DEPSO [11]
EDA-PSO	3.0	**2.5**	8.1	9.2	**1.9**	6.0	23	285	2128	*12e-5/1e5*	EDA-PSO [5]
full NEWUOA	6.9	3.0	**3.1**	16	**1.3**	**2.5**	7.4	13	25	53	full NEWUOA [22]
GLOBAL	3.3	**2.2**	8.1	16	**1.2**	**3.0**	**2.9**	7.7	7.0	*10e-3/1e3*	GLOBAL [19]
iAMaLGaM IDEA	**1.9**	**1.7**	4.0	102	14	19	35	65	67	101	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	3.4	**2.7**	5.4	9.4	**1.1**	**1.0**	**1.0**	**1.1**	**1.0**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**2.1**	**2.2**	6.3	**7.7**	**1**	**1.7**	**2.8**	**3.8**	**3.9**	**10**	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	7.7	31	87	*11e-4/3e4*	.	.	MCS [15]
(1+1)-ES	**2.8**	**2.1**	3.4	15	**1.9**	4.5	16	95	798	*18e-7/1e6*	(1+1)-ES [1]
PSO	**1.8**	**2.1**	8.1	10	**1.6**	4.6	89	360	971	*41e-5/1e5*	PSO [6]
PSO_Bounds	**2.5**	**2.1**	6.2	**8.8**	**1.7**	6.2	46	232	1053	*10e-5/1e5*	PSO_Bounds [7]
Monte Carlo	3.1	**2.4**	5.9	14	5.6	28	298	2776	9813	*17e-5/1e6*	Monte Carlo [3]
SNOBFIT	**2.9**	**2.0**	**2.9**	10	**2.5**	7.0	62	58	*12e-3/3e3*	.	SNOBFIT [16]
VNS (Garcia)	10	3.9	9.2	14	**1.3**	**1**	**1**	**1**	**1**	**1.0**	VNS (Garcia) [10]

Table 13: Running time excess ERT/$\mathrm{ERT_{best}}$ on f_{113} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

113 Step-ellipsoid Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
$\mathrm{ERT_{best}}$/D	0.50	1.1	2.4	16	44	70	87	87	87	438	$\mathrm{ERT_{best}}$/D
ALPS-GA	**1**	**1.6**	**2.2**	4.3	12	11	13	13	13	4.1	ALPS-GA [14]
AMaLGaM IDEA	**1.3**	**1.6**	**2.3**	**1.1**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1.3**	**1.3**	**2.4**	**2.3**	30	26	69	69	69	20	BayEDAcG [9]
BFGS	26	24	81	91	258	*60e-2/3e3*	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	40	21	12	7.4	11	17	19	19	19	4.4	(1+1)-CMA-ES [2]
DASA	9.5	125	223	184	381	597	773	773	773	381	DASA [17]
DEPSO	**1.7**	**1.8**	4.3	5.4	5.2	5.8	**7.1**	**7.1**	**7.1**	**1.6**	DEPSO [11]
EDA-PSO	**1.7**	**1.9**	**2.5**	**2.5**	6.8	19	25	25	25	7.3	EDA-PSO [5]
full NEWUOA	**2.2**	11	11	4.8	17	26	47	47	47	15	full NEWUOA [22]
GLOBAL	**2.0**	**1.9**	4.2	4.1	5.5	**5.7**	7.6	7.6	7.6	**1.7**	GLOBAL [19]
iAMaLGaM IDEA	**1.6**	**1.6**	**2.9**	**1**	20	13	10	10	10	**2.1**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1.8**	3.3	4.2	13	32	27	27	27	27	5.3	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1.1**	**1**	**2.6**	**2.6**	5.6	7.2	10	10	10	**2.3**	MA-LS-Chain [18]
MCS	**1.4**	**1.3**	**1**	**1.2**	6.1	37	76	76	76	57	MCS [15]
(1+1)-ES	9.3	10	13	5.7	6.4	8.9	15	15	15	3.7	(1+1)-ES [1]
PSO	**1.4**	**1.8**	4.7	**2.6**	**3.6**	**5.1**	**5.9**	**5.9**	**5.9**	**1.6**	PSO [6]
PSO_Bounds	**1.2**	**1.6**	3.4	**2.0**	**4.3**	11	13	13	13	5.0	PSO_Bounds [7]
Monte Carlo	**1.6**	**1.6**	**2.9**	4.7	18	54	165	165	165	127	Monte Carlo [3]
SNOBFIT	**1**	**1.1**	**1.8**	4.0	10	20	20	20	20	5.1	SNOBFIT [16]
VNS (Garcia)	**1**	**2.2**	**2.7**	25	63	52	43	43	43	8.6	VNS (Garcia) [10]

Table 14: Running time excess ERT/ERT$_{\text{best}}$ on f_{114} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

114 Step-ellipsoid unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.50	0.83	4.4	21	349	1237	2671	2671	2671	4340	ERT$_{\text{best}}$/D
ALPS-GA	**1.2**	**1**	**1.6**	3.1	**1.8**	**1.3**	**1**	**1**	**1**	**1**	ALPS-GA [14]
AMaLGaM IDEA	**1.2**	**1.8**	**1.8**	**1.5**	6.1	3.1	**2.8**	**2.8**	**2.8**	**2.8**	AMaLGaM IDEA [4]
BayEDAcG	**1.5**	**1.9**	**2.1**	38	37	23	*60e-2/2e3*	.	.	.	BayEDAcG [9]
BFGS	8.8	18	10	7.2	6.9	*49e-2/800*	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1.2**	27	19	8.1	6.2	4.5	4.0	4.0	4.0	7.9	(1+1)-CMA-ES [2]
DASA	101	248	220	222	106	90	125	125	125	158	DASA [17]
DEPSO	**1.8**	**1.7**	**1.3**	7.8	3.3	3.1	5.5	5.5	5.5	7.0	DEPSO [11]
EDA-PSO	**1.3**	**1.6**	**1.6**	**2.2**	**1.6**	**2.0**	**1.1**	**1.1**	**1.1**	**1.0**	EDA-PSO [5]
full NEWUOA	**2.3**	67	91	95	40	18	18	18	18	*11e-2/7e3*	full NEWUOA [22]
GLOBAL	**1.2**	**2.4**	**2.4**	**2.6**	**2.0**	**2.6**	3.1	3.1	3.1	6.5	GLOBAL [19]
iAMaLGaM IDEA	**1.3**	**2.3**	29	65	23	10	5.2	5.2	5.2	3.5	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**2.1**	10	15	29	4.6	5.3	3.7	3.7	3.7	3.1	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1.2**	**1.5**	**1.9**	**2.8**	**1**	**1**	**1.2**	**1.2**	**1.2**	**1.3**	MA-LS-Chain [18]
MCS	**1.4**	3.4	**1.2**	5.5	3.4	7.0	17	17	17	*38e-4/3e4*	MCS [15]
(1+1)-ES	**2.2**	18	25	13	7.2	7.0	6.4	6.4	6.4	6.4	(1+1)-ES [1]
PSO	**1.3**	**1.8**	**1**	**1.8**	23	22	12	12	12	7.4	PSO [6]
PSO_Bounds	**1.5**	**2.3**	**1.0**	**1**	73	30	15	15	15	10	PSO_Bounds [7]
Monte Carlo	**1.5**	**1.7**	**1.2**	**1.6**	**1.9**	4.3	4.7	4.7	4.7	20	Monte Carlo [3]
SNOBFIT	**1.7**	**2.7**	**1.5**	3.8	**2.6**	**2.5**	**2.9**	**2.9**	**2.9**	**2.6**	SNOBFIT [16]
VNS (Garcia)	**1**	**2.9**	**1.4**	91	12	7.9	6.1	6.1	6.1	4.1	VNS (Garcia) [10]

Table 15: Running time excess ERT/ERT$_{\text{best}}$ on f_{115} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

115 Step-ellipsoid Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.50	1.0	1.6	6.4	112	180	197	197	197	271	ERT$_{\text{best}}$/D
ALPS-GA	**1.3**	**2.0**	**2.7**	11	4.4	6.6	10	10	10	16	ALPS-GA [14]
AMaLGaM IDEA	**1.3**	**1.3**	**2.5**	**3.1**	7.5	4.8	4.4	4.4	4.4	11	AMaLGaM IDEA [4]
BayEDAcG	**1.4**	**1.1**	7.4	31	28	157	144	144	144	104	BayEDAcG [9]
BFGS	13	23	92	145	200	*49e-2/2e3*	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1.7**	**2.7**	5.0	14	**2.4**	4.2	16	16	16	25	(1+1)-CMA-ES [2]
DASA	16	39	144	423	111	228	585	585	585	1573	DASA [17]
DEPSO	**1**	**1.4**	5.4	9.0	**1.6**	3.4	3.9	3.9	3.9	**4.3**	DEPSO [11]
EDA-PSO	**1.3**	**1.2**	3.3	4.3	**2.1**	4.3	17	17	17	64	EDA-PSO [5]
full NEWUOA	**1.7**	**2.5**	3.0	7.1	**1.8**	**2.9**	8.0	8.0	8.0	9.3	full NEWUOA [22]
GLOBAL	**1.9**	**1.9**	4.7	6.6	**1.9**	3.1	4.6	4.6	4.6	13	GLOBAL [19]
iAMaLGaM IDEA	**1.2**	**1.4**	3.1	28	14	8.8	12	12	12	14	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1.8**	4.1	4.8	7.3	**1**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1.5**	**2.0**	4.2	**3.9**	**1.3**	**2.9**	**3.4**	**3.4**	**3.4**	4.7	MA-LS-Chain [18]
MCS	**1.4**	**1.4**	**1**	4.4	**2.5**	52	87	87	87	449	MCS [15]
(1+1)-ES	**1.9**	3.4	5.8	16	**2.4**	3.7	5.5	5.5	5.5	14	(1+1)-ES [1]
PSO	**1.3**	**2.5**	4.6	6.2	66	72	120	120	120	281	PSO [6]
PSO_Bounds	**1.6**	**2.1**	6.4	5.8	3.0	44	166	166	166	378	PSO_Bounds [7]
Monte Carlo	**1.3**	**1**	**3.0**	4.7	5.6	23	89	89	89	256	Monte Carlo [3]
SNOBFIT	**1.5**	**1.4**	**2.1**	**1**	**2.1**	7.4	22	22	22	63	SNOBFIT [16]
VNS (Garcia)	**1**	**2.3**	3.9	26	**2.1**	**1.6**	**1.7**	**1.7**	**1.7**	**1.4**	VNS (Garcia) [10]

Table 16: Running time excess ERT/ERT$_{\text{best}}$ on f_{116} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

116 Ellipsoid Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	3.3	6.8	25	50	78	103	138	165	521	894	ERT$_{\text{best}}$/D
ALPS-GA	**1.8**	3.1	3.6	14	23	33	45	56	30	27	ALPS-GA [14]
AMaLGaM IDEA	**1.7**	**1.6**	**1.2**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**2.8**	5.2	10	63	109	280	*28e-1/2e3*	.	.	.	BayEDAcG [9]
BFGS	30	35	60	408	*53e-1/1e3*	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1.7**	**1.7**	8.1	11	29	49	109	416	273	159	(1+1)-CMA-ES [2]
DASA	48	47	43	131	500	1036	1903	12708	18217	*29e-5/7e5*	DASA [17]
DEPSO	**1.4**	4.2	6.8	13	**15**	**24**	31	41	18	16	DEPSO [11]
EDA-PSO	**1.9**	3.6	5.1	18	30	46	64	76	29	27	EDA-PSO [5]
full NEWUOA	8.3	15	11	17	44	106	317	*11e-3/6e3*	.	.	full NEWUOA [22]
GLOBAL	**1.4**	4.1	3.5	**8.3**	**12**	37	28	31	10	18	GLOBAL [19]
iAMaLGaM IDEA	**1.2**	**1.8**	6.7	24	23	**19**	**14**	**12**	**4.1**	**2.5**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	11	8.1	17	40	41	32	**24**	**20**	**6.5**	**3.9**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**2.4**	3.7	3.3	11	23	43	49	51	22	15	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	13	86	734	*24e-3/3e4*	.	.	.	MCS [15]
(1+1)-ES	5.9	3.7	**3.2**	12	20	64	129	502	352	1452	(1+1)-ES [1]
PSO	**2.3**	3.7	5.9	35	124	102	84	79	28	20	PSO [6]
PSO_Bounds	3.4	**3.0**	13	414	280	235	187	178	82	63	PSO_Bounds [7]
Monte Carlo	**2.0**	**2.5**	5.5	29	280	2694	9157	41251	*80e-5/1e6*	.	Monte Carlo [3]
SNOBFIT	**1.7**	**1.6**	5.0	**8.9**	48	105	123	*12e-2/3e3*	.	.	SNOBFIT [16]
VNS (Garcia)	**1.8**	4.0	67	75	55	50	39	35	13	16	VNS (Garcia) [10]

Table 17: Running time excess ERT/ERT$_{\text{best}}$ on f_{117} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

117 Ellipsoid unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	4.8	17	84	673	3227	6957	17625	27869	51616	88754	ERT$_{\text{best}}$/D
ALPS-GA	**1.6**	**1.8**	**1.6**	**1.1**	**1.1**	**1**	**1.1**	**1.3**	**1**	**1.9**	ALPS-GA [14]
AMaLGaM IDEA	**1.7**	**1.3**	4.9	10	4.5	4.6	**2.1**	**1.4**	**1.0**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**2.4**	**2.6**	17	42	*78e-1/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	8.6	5.3	4.9	6.2	**2.7**	*40e-1/600*	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	10	4.5	5.0	**1.8**	**2.1**	10	8.1	*32e-3/1e4*	.	.	(1+1)-CMA-ES [2]
DASA	90	80	58	51	46	118	251	*71e-4/6e5*	.	.	DASA [17]
DEPSO	**1**	4.1	3.6	**1.9**	4.1	*46e-2/2e3*	.	.	.	.	DEPSO [11]
EDA-PSO	**1.3**	**2.6**	**1.2**	6.0	**2.4**	**2.5**	3.7	5.2	5.9	5.0	EDA-PSO [5]
full NEWUOA	55	41	25	14	31	14	*87e-2/7e3*	.	.	.	full NEWUOA [22]
GLOBAL	**1.4**	**1**	**2.3**	**1.3**	**1.9**	**1.8**	*25e-2/2e3*	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	43	12	11	5.7	4.5	3.4	**1.6**	**1.3**	**1.2**	**1.6**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	22	27	10	5.3	**2.8**	**1.9**	**1**	**1**	**1.4**	*39e-4/1e4*	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1.3**	**1.1**	**1.2**	**1**	**1**	**1.7**	**1.5**	6.6	*27e-4/1e4*	.	MA-LS-Chain [18]
MCS	**1.4**	**1.2**	**1**	**1.4**	4.2	8.4	*27e-3/3e4*	.	.	.	MCS [15]
(1+1)-ES	3.1	6.0	6.2	**2.3**	**1.9**	4.0	6.6	25	34	161	(1+1)-ES [1]
PSO	**1.4**	**1.3**	4.6	55	12	13	8.9	8.4	8.5	16	PSO [6]
PSO_Bounds	**2.2**	**1.1**	**1.6**	55	21	17	17	24	13	16	PSO_Bounds [7]
Monte Carlo	**1.5**	**1.0**	**2.8**	3.2	4.4	31	93	504	*10e-4/1e6*	.	Monte Carlo [3]
SNOBFIT	**2.1**	**1.2**	3.5	**2.6**	5.1	**2.5**	*51e-2/3e3*	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1.3**	**1.3**	41	11	5.6	4.5	3.1	6.7	10	100	VNS (Garcia) [10]

Table 18: Running time excess ERT/ERT$_{\text{best}}$ on f_{118} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

118 Ellipsoid Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	2.1	2.5	10	52	66	252	292	326	388	486	ERT$_{\text{best}}$/D
ALPS-GA	6.3	10	12	13	20	12	60	631	2411	*44e-7/2e6*	ALPS-GA [14]
AMaLGaM IDEA	4.4	7.2	**3.0**	**1**	**1**	**1.6**	4.0	6.2	14	20	AMaLGaM IDEA [4]
BayEDAcG	3.1	7.7	5.9	28	66	113	*71e-2/2e3*	.	.	.	BayEDAcG [9]
BFGS	17	20	17	16	59	49	42	54	45	56	BFGS [21]
(1+1)-CMA-ES	**2.8**	6.9	18	11	21	12	45	455	*98e-5/1e4*	.	(1+1)-CMA-ES [2]
DASA	16	19	127	111	238	119	1333	14760	*43e-5/7e5*	.	DASA [17]
DEPSO	5.4	11	14	15	29	13	19	92	*30e-3/2e3*	.	DEPSO [11]
EDA-PSO	**2.8**	5.1	9.0	15	41	49	195	512	1777	*12e-5/1e5*	EDA-PSO [5]
full NEWUOA	**2.3**	**2.6**	**2.3**	**2.8**	7.3	3.5	7.5	60	221	*40e-5/6e3*	full NEWUOA [22]
GLOBAL	3.6	7.8	9.5	3.6	**3.1**	**1.5**	**2.8**	4.1	4.9	*64e-6/800*	GLOBAL [19]
iAMaLGaM IDEA	3.1	5.4	**2.3**	3.4	8.8	5.0	8.5	10	14	34	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	4.1	9.3	17	6.2	6.0	**1.9**	**1.7**	**1.6**	**1.4**	**1.3**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	5.7	7.9	6.9	6.2	7.6	**2.6**	**2.7**	**3.0**	**3.8**	**3.9**	MA-LS-Chain [18]
MCS	**1**	**1**	**1.3**	**1.3**	41	38	152	1142	*27e-4/3e4*	.	MCS [15]
(1+1)-ES	3.6	7.8	17	19	41	43	143	1179	5450	*12e-6/1e6*	(1+1)-ES [1]
PSO	**2.1**	5.0	10	9.4	42	80	195	653	1186	*33e-5/1e5*	PSO [6]
PSO_Bounds	3.2	7.7	12	149	136	176	370	2158	*88e-5/1e5*	.	PSO_Bounds [7]
Monte Carlo	**2.6**	8.4	14	46	252	336	3452	*64e-5/1e6*	.	.	Monte Carlo [3]
SNOBFIT	**1.7**	**2.2**	**1**	**1.0**	4.1	6.7	19	108	95	*32e-4/3e3*	SNOBFIT [16]
VNS (Garcia)	**2.9**	9.1	14	3.7	**3.4**	**1**	**1**	**1**	**1**	**1**	VNS (Garcia) [10]

Table 19: Running time excess ERT/ERT$_{\text{best}}$ on f_{119} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

119 Sum of different powers Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.50	0.50	0.70	5.4	36	163	520	950	2384	5041	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.5**	**1.6**	**1.8**	**2.9**	3.8	3.0	**2.9**	**1.9**	8.5	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.7**	78	13	6.8	3.3	**2.5**	**1.2**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.3**	**1.4**	6.3	4.4	**2.2**	**2.1**	4.4	3.9	*18e-5/2e3*	BayEDAcG [9]
BFGS	**1**	12	43	58	159	310	*13e-2/4e3*	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1.5**	12	7.9	3.9	**1.6**	3.0	**2.4**	6.6	(1+1)-CMA-ES [2]
DASA	**1**	**1**	91	283	167	193	204	330	600	1771	DASA [17]
DEPSO	**1**	**1**	**1.6**	**2.5**	3.6	**2.0**	**1**	**1**	**1**	*79e-7/2e3*	DEPSO [11]
EDA-PSO	**1**	**1.3**	**1.2**	**2.3**	**2.6**	**2.7**	3.1	4.4	**2.9**	32	EDA-PSO [5]
full NEWUOA	**1**	**1.6**	3.2	8.7	4.8	7.3	11	15	38	*32e-5/6e3*	full NEWUOA [22]
GLOBAL	**1**	**1.3**	**1.6**	**2.3**	4.1	**2.3**	**1.6**	**2.2**	**2.0**	*32e-5/700*	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.1**	**1.4**	**2.1**	7.8	6.6	4.5	**3.0**	**2.1**	**1.6**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.2**	**1.7**	**2.2**	**1**	**2.1**	**1.3**	**2.8**	**1.7**	**1.2**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.2**	**1.7**	**2.6**	**2.6**	**2.3**	**1.4**	**1.3**	**1.0**	**2.1**	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1.2**	21	145	*18e-4/3e4*	.	.	MCS [15]
(1+1)-ES	**1**	**2.0**	11	22	7.3	**1.9**	**1.1**	3.1	3.3	11	(1+1)-ES [1]
PSO	**1**	**1.1**	**2.0**	3.0	**2.5**	**1.9**	**1.5**	**1.3**	4.4	47	PSO [6]
PSO_Bounds	**1**	**1.1**	**2.0**	**2.0**	3.3	**3.0**	3.6	4.1	4.0	45	PSO_Bounds [7]
Monte Carlo	**1**	**1.4**	**1.7**	**2.1**	6.8	41	376	2512	*18e-5/1e6*	.	Monte Carlo [3]
SNOBFIT	**1**	**1.3**	**1.9**	**1.3**	3.2	**2.1**	**2.7**	4.0	**2.6**	7.4	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**2.1**	4.2	**2.8**	**1**	**2.5**	**2.9**	**2.4**	6.6	VNS (Garcia) [10]

Table 20: Running time excess ERT/ERT$_{\text{best}}$ on f_{120} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

120 Sum of different powers unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.50	0.50	0.70	5.7	187	1257	5027	12965	47271	5.73e5	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.1**	**1.9**	**1.1**	**2.0**	**1.2**	**1.2**	**1**	**1**	**1**	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.3**	**1.2**	**1.3**	6.4	7.3	5.5	7.1	5.5	**3.4**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.1**	3.1	22	*21e-2/2e3*	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**2.0**	7.6	20	14	10	*13e-2/800*	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1.1**	**2.6**	13	3.4	9.0	30	*57e-4/1e4*	.	.	(1+1)-CMA-ES [2]
DASA	**1**	72	86	307	61	73	177	205	183	*89e-5/6e5*	DASA [17]
DEPSO	**1**	**1**	**1.5**	3.2	**2.2**	4.0	*14e-3/2e3*	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1.2**	**1.8**	**1**	**1.1**	**1.4**	**1.7**	**2.3**	3.4	*10e-6/1e5*	EDA-PSO [5]
full NEWUOA	**1**	20	48	77	17	76	*44e-3/7e3*	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1.1**	**1.5**	**2.1**	**1.1**	3.8	*13e-3/2e3*	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.2**	**1.3**	57	26	14	8.6	14	13	**26**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.3**	**3.0**	35	14	5.1	**2.8**	11	*36e-5/1e4*	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.2**	**1.6**	**2.2**	**1**	**1**	**1**	**1.1**	**3.1**	*99e-6/1e4*	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	3.8	3.1	14	23	*38e-4/3e4*	.	.	MCS [15]
(1+1)-ES	**1**	**2.0**	11	25	4.8	5.3	5.8	22	18	*50e-7/1e6*	(1+1)-ES [1]
PSO	**1**	**1.3**	**2.0**	**2.4**	39	7.0	3.3	3.1	**3.3**	*12e-6/1e5*	PSO [6]
PSO_Bounds	**1**	**1.3**	**1.4**	3.0	**1.1**	7.0	3.7	5.8	3.9	*29e-6/1e5*	PSO_Bounds [7]
Monte Carlo	**1**	**1.3**	**1.5**	**2.2**	**2.2**	5.9	15	246	*16e-5/1e6*	.	Monte Carlo [3]
SNOBFIT	**1**	**1.3**	**1.7**	**2.6**	**2.0**	3.9	*19e-3/3e3*	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**2.1**	4.0	20	5.9	**2.8**	3.3	6.4	42	VNS (Garcia) [10]

Table 21: Running time excess ERT/ERT$_{\text{best}}$ on f_{121} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

121 Sum of different powers Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.50	0.50	0.70	3.5	21	80	164	376	560	851	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.4**	**2.0**	5.0	9.5	16	90	677	3529	*50e-7/2e6*	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.1**	**1.4**	**2.7**	**1.4**	20	30	29	38	155	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.1**	**1.3**	4.7	10	4.3	4.7	10	53	*28e-5/2e3*	BayEDAcG [9]
BFGS	**1**	10	22	34	16	13	27	46	48	*78e-5/4e3*	BFGS [21]
(1+1)-CMA-ES	**1**	**1.2**	3.4	7.9	14	18	61	187	*62e-5/1e4*	.	(1+1)-CMA-ES [2]
DASA	**1**	14	156	271	228	785	5455	*12e-4/6e5*	.	.	DASA [17]
DEPSO	**1**	**1.6**	**2.2**	4.2	5.1	3.7	5.4	77	*38e-5/2e3*	.	DEPSO [11]
EDA-PSO	**1**	**1**	**1.6**	4.0	3.2	13	179	1820	*55e-5/1e5*	.	EDA-PSO [5]
full NEWUOA	**1**	**2.1**	4.0	**1.6**	**1.7**	**1.3**	8.9	15	25	*34e-6/5e3*	full NEWUOA [22]
GLOBAL	**1**	**1.3**	**1.8**	**2.6**	7.6	4.6	10	21	*59e-5/2e3*	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.4**	**1.7**	**2.2**	15	10	25	32	64	247	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.2**	3.0	5.2	**1.8**	**1**	**1**	**1**	**1.2**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.3**	**1.6**	4.5	4.0	3.7	**4.4**	**4.2**	**7.1**	**38**	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1**	89	512	*23e-4/3e4*	.	.	MCS [15]
(1+1)-ES	**1**	**1.6**	3.2	4.8	4.3	8.7	58	322	5522	*16e-6/1e6*	(1+1)-ES [1]
PSO	**1**	**1.3**	**1.6**	3.3	6.2	80	309	1859	2528	*32e-5/1e5*	PSO [6]
PSO_Bounds	**1**	**1.2**	**2.2**	3.0	7.4	211	400	411	1246	*21e-5/1e5*	PSO_Bounds [7]
Monte Carlo	**1**	**1.3**	**1.6**	**2.6**	9.4	62	832	12626	26618	*27e-5/1e6*	Monte Carlo [3]
SNOBFIT	**1**	**1.1**	**1.9**	**1.9**	**2.2**	10	73	*24e-4/3e3*	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**2.1**	6.5	4.1	**1.5**	**1.6**	**1.1**	**1**	**1.1**	VNS (Garcia) [10]

Table 22: Running time excess ERT/ERT$_{\text{best}}$ on f_{122} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

122 Schaffer F7 Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.50	0.50	1.5	48	515	1081	2135	3329	3549	5640	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.2**	**2.0**	**2.9**	**2.2**	**2.6**	**2.2**	**2.0**	**2.5**	**2.8**	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.1**	**2.5**	14	3.4	3.2	**2.0**	**1.5**	**1.8**	**1.6**	AMaLGaM IDEA [4]
BayEDAcG	**1.1**	**1.1**	**1.7**	3.2	**1.7**	6.3	*16e-3/2e3*	.	.	.	BayEDAcG [9]
BFGS	**1**	3.8	46	40	*47e-2/3e3*	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1.9**	16	5.1	4.7	6.1	32	*48e-4/1e4*	.	.	(1+1)-CMA-ES [2]
DASA	**1**	30	318	170	151	630	4071	*87e-4/6e5*	.	.	DASA [17]
DEPSO	**1**	**1.3**	**1**	**2.6**	**1**	**1**	**1**	**1.0**	4.2	*57e-6/2e3*	DEPSO [11]
EDA-PSO	**1**	**1.6**	**2.8**	**1.2**	4.5	5.6	5.1	4.4	5.5	4.8	EDA-PSO [5]
full NEWUOA	**1**	**1.4**	11	7.0	10	41	*59e-3/6e3*	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.8**	**1.7**	**1.7**	*64e-3/1e3*	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.3**	**1.7**	19	3.4	5.1	3.9	3.2	3.7	3.2	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**2.3**	3.9	15	**2.6**	**1.6**	**1.3**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.4**	**1.7**	**2.1**	**1.8**	**2.0**	**1.4**	**1.2**	**1.6**	**2.6**	MA-LS-Chain [18]
MCS	**1**	**1**	**1.4**	**1**	12	156	*18e-3/3e4*	.	.	.	MCS [15]
(1+1)-ES	**1.1**	40	21	3.5	3.7	11	34	286	1314	*29e-6/1e6*	(1+1)-ES [1]
PSO	**1**	**1.1**	**2.2**	3.5	5.5	4.6	**2.9**	**2.4**	**2.9**	**2.7**	PSO [6]
PSO_Bounds	**1**	**1.1**	**1.7**	**1.3**	**1.8**	4.0	3.6	3.1	4.8	5.5	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**2.4**	**2.9**	29	919	*79e-4/1e6*	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.3**	**1.8**	**2.5**	**1.6**	**2.0**	3.2	*75e-4/3e3*	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**2.2**	27	7.4	4.5	3.2	3.5	10	50	VNS (Garcia) [10]

Table 23: Running time excess ERT/ERT$_{\text{best}}$ on f_{123} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

123 Schaffer F7 unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.50	0.50	1.6	106	3186	20054	36080	7.24e5	1.49e7	nan	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.1**	**1.6**	**1.2**	**1**	**1**	**4.1**	**1.6**	**1.1**	***29e-6/2e6***	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.3**	**1.7**	22	6.0	7.9	27	9.2	***98e-5/1e6***	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.5**	**2.6**	23	*10e-1/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	6.4	7.1	*53e-2/800*	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1.9**	20	7.7	10	3.6	*16e-2/1e4*	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	4.1	131	77	52	*40e-3/6e5*	.	.	.	.	DASA [17]
DEPSO	**1**	**1.2**	**1.7**	**2.7**	**2.1**	*19e-2/2e3*	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1.1**	**1.6**	**1.4**	**1.2**	4.0	*81e-4/1e5*	.	.	.	EDA-PSO [5]
full NEWUOA	**1.1**	11	73	27	31	*36e-2/7e3*	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1.4**	**1.7**	**1.3**	**1.4**	*16e-2/2e3*	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1.1**	**1.4**	**2.1**	57	7.6	16	71	20	**1**	***11e-4/1e6***	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.3**	74	23	4.7	*92e-3/1e4*	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.3**	**2.3**	**1.2**	**1.2**	7.4	*32e-3/1e4*	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1.8**	8.7	*58e-3/3e4*	.	.	.	.	MCS [15]
(1+1)-ES	**1**	**2.5**	66	8.7	4.9	23	188	*57e-4/1e6*	.	.	(1+1)-ES [1]
PSO	**1.1**	**1.1**	**2.4**	3.2	3.9	4.3	19	**2.0**	***58e-4/1e5***	.	PSO [6]
PSO_Bounds	**1.1**	**1.3**	**2.3**	**1.2**	5.9	3.8	**19**	**1**	***47e-4/1e5***	.	PSO_Bounds [7]
Monte Carlo	**1**	**1.2**	**1.8**	**1**	5.3	97	*12e-3/1e6*	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.4**	**1.2**	**3.0**	**2.6**	**1.8**	**1**	*21e-2/3e3*	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**2.1**	46	5.1	**3.5**	24	36	***21e-5/1e7***	.	VNS (Garcia) [10]

Table 24: Running time excess ERT/$\mathrm{ERT}_{\mathrm{best}}$ on f_{124} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

124 Schaffer F7 Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
$\mathrm{ERT}_{\mathrm{best}}$/D	0.50	0.50	1.8	32	239	529	1321	1737	2798	4510	$\mathrm{ERT}_{\mathrm{best}}$/D
ALPS-GA	**1.1**	**1.4**	**1.5**	**2.5**	3.8	112	2960	*10e-4/2e6*	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.1**	**1.4**	11	5.5	7.8	17	**28**	**44**	**454**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.3**	**1.6**	3.3	**1.9**	**1.8**	**7.1**	*15e-4/2e3*	.	.	BayEDAcG [9]
BFGS	**1**	17	48	78	*53e-2/4e3*	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**2.7**	**1.9**	4.9	3.7	57	106	*17e-3/1e4*	.	.	(1+1)-CMA-ES [2]
DASA	**1.6**	6.0	111	165	510	*32e-3/6e5*	.	.	.	.	DASA [17]
DEPSO	**1**	**1.1**	**1.4**	4.0	**2.8**	**5.7**	*79e-4/2e3*	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1.1**	**1**	**2.0**	6.1	851	*18e-3/1e5*	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1.8**	**2.5**	5.4	6.0	31	*17e-3/5e3*	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.2**	**2.8**	4.4	16	*98e-3/1e3*	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1.1**	**1.3**	**1.9**	5.6	6.3	15	23	41	**106**	666	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.1**	4.9	**2.2**	**1**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.3**	**2.0**	**2.1**	**1.8**	27	108	*14e-3/1e4*	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	63	*68e-3/3e4*	.	.	.	.	MCS [15]
(1+1)-ES	**1.1**	**1.6**	10	5.6	4.0	23	1527	*10e-4/1e6*	.	.	(1+1)-ES [1]
PSO	**1**	**1.3**	**1.3**	**1.8**	8.5	362	351	*13e-3/1e5*	.	.	PSO [6]
PSO_Bounds	**1**	**1.3**	**1.4**	**1.8**	74	277	*14e-3/1e5*	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1.1**	**1.4**	5.9	56	1872	11247	*78e-4/1e6*	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.3**	**2.1**	3.5	5.4	69	*32e-3/3e3*	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1.9**	26	8.5	14	**16**	**30**	219	**337**	VNS (Garcia) [10]

Table 25: Running time excess $\mathrm{ERT}/\mathrm{ERT}_{\mathrm{best}}$ on f_{125} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

125 Griewank-Rosenbrock Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
$\mathrm{ERT}_{\mathrm{best}}$/D	0.50	0.50	0.50	0.50	0.50	74	575	1228	1927	3778	$\mathrm{ERT}_{\mathrm{best}}$/D
ALPS-GA	**1**	**1**	**1**	4.3	77	3.6	**1.5**	**1.3**	**1.6**	**1.6**	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.1**	3.3	38	**1**	13	7.7	5.5	**2.9**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.3**	5.5	**32**	**1.5**	**1**	**2.0**	3.4	*49e-6/2e3*	BayEDAcG [9]
BFGS	**1**	**1**	11	87	727	40	49	46	*59e-4/4e3*	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1**	3.5	84	4.0	4.4	**2.9**	4.0	3.2	(1+1)-CMA-ES [2]
DASA	**1**	**1**	3.9	275	2398	64	91	89	116	218	DASA [17]
DEPSO	**1**	**1**	**1.6**	5.6	115	**2.5**	**1.7**	**1**	**1**	**1**	DEPSO [11]
EDA-PSO	**1**	**1**	**1.2**	3.9	52	**1.4**	**1.9**	**1.9**	**2.4**	**2.1**	EDA-PSO [5]
full NEWUOA	**1**	**1**	**1.8**	7.3	66	**2.5**	3.5	**2.8**	**2.7**	12	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.1**	4.7	56	**2.3**	**1.4**	**1.0**	**1.5**	**1.4**	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**1.2**	4.7	502	13	20	11	7.2	4.2	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1**	**2.7**	198	4.3	5.4	3.6	3.3	**2.4**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.2**	5.6	44	**2.0**	4.0	**2.3**	**2.1**	**1.9**	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1**	**1.2**	8.0	10	13	15	MCS [15]
(1+1)-ES	**1**	**1**	3.0	22	132	5.5	4.2	3.7	**3.0**	6.5	(1+1)-ES [1]
PSO	**1**	**1**	**1.1**	5.1	43	**2.2**	7.4	5.8	6.1	3.5	PSO [6]
PSO_Bounds	**1**	**1**	**1.3**	4.0	32	**1.6**	**2.5**	**2.5**	**1.8**	**2.2**	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1.1**	4.1	53	3.2	4.4	6.5	12	156	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1.2**	4.9	**31**	4.2	4.3	**2.9**	**2.4**	**1.6**	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1.2**	**2.2**	44	**1.7**	9.3	5.9	4.0	**2.4**	VNS (Garcia) [10]

Table 26: Running time excess ERT/ERT_{best} on f_{126} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

126 Griewank-Rosenbrock unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT_{best}/D	0.50	0.50	0.50	0.50	0.50	151	1709	3408	5528	18193	ERT_{best}/D
ALPS-GA	**1**	**1**	**1**	4.6	47	**1.3**	**1.6**	**1.2**	**2.0**	**1.4**	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.1**	5.0	41	8.3	10	7.1	9.1	5.3	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.1**	3.6	339	37	7.6	8.2	5.1	*26e-3/2e3*	BayEDAcG [9]
BFGS	**1**	**1**	**2.0**	17	167	7.7	*95e-4/900*	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1.1**	**2.8**	231	**1.9**	3.9	7.4	6.2	*27e-5/1e4*	(1+1)-CMA-ES [2]
DASA	**1**	**1**	3.7	416	3427	50	59	60	68	79	DASA [17]
DEPSO	**1**	**1**	**1.2**	4.7	64	3.6	3.3	4.2	**2.6**	**1.6**	DEPSO [11]
EDA-PSO	**1**	**1**	**1.2**	3.5	**33**	**1.2**	**1.5**	**2.2**	**2.8**	3.2	EDA-PSO [5]
full NEWUOA	**1**	**1**	19	132	557	8.9	17	*27e-4/7e3*	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.1**	3.7	57	**1.7**	**2.4**	**1.3**	**1.5**	*17e-4/2e3*	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**1.1**	4.7	956	20	10	10	14	8.4	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1.1**	18	590	7.8	7.4	6.6	5.0	8.2	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.3**	6.3	53	**1.3**	**1**	**1**	**1**	**1**	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1**	**1.6**	3.4	4.3	7.1	*19e-6/3e4*	MCS [15]
(1+1)-ES	**1**	**1**	**2.1**	39	225	**2.5**	4.7	6.8	8.3	8.0	(1+1)-ES [1]
PSO	**1**	**1**	**1.3**	5.2	57	**1.2**	11	7.8	6.9	4.2	PSO [6]
PSO_Bounds	**1**	**1**	**1.1**	6.7	51	**1**	4.6	4.4	4.1	**2.6**	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1**	**2.9**	**31**	**1.8**	**1.6**	**2.4**	4.2	13	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1.3**	6.9	56	5.9	10	5.0	3.1	**2.0**	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1.2**	**2.2**	67	17	7.0	6.4	5.4	5.4	VNS (Garcia) [10]

Table 27: Running time excess ERT/ERT$_{\text{best}}$ on f_{127} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

127 Griewank-Rosenbrock Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.50	0.50	0.50	0.50	0.50	93	593	2014	3386	3638	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1.1**	6.3	43	**2.0**	3.7	4.0	7.1	90	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.3**	4.7	28	11	16	8.4	10	17	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.1**	6.1	50	**1**	**1**	**1**	4.1	*62e-6/2e3*	BayEDAcG [9]
BFGS	**1**	**1**	5.2	54	584	15	45	27	*16e-4/4e3*	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1.1**	6.5	139	5.1	12	8.4	14	*25e-5/1e4*	(1+1)-CMA-ES [2]
DASA	**1**	**1**	14	172	2172	86	212	125	438	2416	DASA [17]
DEPSO	**1**	**1**	**1.3**	3.1	**27**	**1.7**	**1.6**	**2.1**	**2.0**	**4.0**	DEPSO [11]
EDA-PSO	**1**	**1**	**1.3**	3.7	40	**2.1**	6.4	7.9	12	116	EDA-PSO [5]
full NEWUOA	**1**	**1**	**1.4**	13	84	**2.0**	5.3	3.7	7.2	22	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.3**	5.7	66	**2.4**	7.7	*16e-4/2e3*	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**1.1**	**2.8**	**27**	7.9	10	11	13	38	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1.1**	4.9	47	**2.8**	3.7	**1.6**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.1**	7.3	44	**1.3**	**3.3**	**1.9**	**3.2**	20	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1**	3.2	5.6	5.8	6.4	*42e-7/3e4*	MCS [15]
(1+1)-ES	**1**	**1**	**1.9**	6.3	64	**2.2**	7.1	5.4	8.4	88	(1+1)-ES [1]
PSO	**1**	**1**	**1.4**	4.3	35	**2.2**	30	19	16	86	PSO [6]
PSO_Bounds	**1**	**1**	**1**	7.5	44	**1.4**	89	47	37	125	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1.1**	4.4	56	**2.7**	6.1	4.9	11	113	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1**	4.7	36	3.8	11	5.5	11	**10**	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1.2**	**2.2**	48	7.5	26	12	8.0	12	VNS (Garcia) [10]

Table 28: Running time excess ERT/ERT_{best} on f_{128} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

128 Gallagher Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT_{best}/D	0.50	0.50	0.90	21	67	157	194	205	297	310	ERT_{best}/D
ALPS-GA	**1**	**1**	**1.3**	**2.2**	**2.2**	**2.3**	**2.7**	4.9	4.5	6.2	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1**	47	32	14	12	13	9.0	10	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.1**	4.8	3.4	5.2	11	14	18	45	BayEDAcG [9]
BFGS	**1**	**1**	12	65	59	60	271	*20e-3/4e3*	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1.9**	16	6.7	3.0	**2.5**	**2.6**	**1.8**	**2.0**	(1+1)-CMA-ES [2]
DASA	**1**	**1**	50	167	137	72	75	100	178	400	DASA [17]
DEPSO	**1**	**1**	**1.0**	3.9	4.4	**2.4**	**2.2**	**2.4**	**1.9**	**2.4**	DEPSO [11]
EDA-PSO	**1**	**1**	**1.1**	3.5	**2.2**	**1.7**	**2.6**	4.9	4.6	5.8	EDA-PSO [5]
full NEWUOA	**1**	**1**	3.1	21	13	10	10	13	11	15	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.5**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**1.0**	109	79	41	33	32	22	21	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1.0**	28	41	21	17	18	14	14	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.7**	**1.5**	**2.1**	**1.8**	3.2	3.7	3.0	3.2	MA-LS-Chain [18]
MCS	**1**	**1**	**1.4**	**2.1**	**1.9**	**1.1**	**1.1**	**1.9**	8.8	82	MCS [15]
(1+1)-ES	**1**	**1**	**1.8**	11	7.5	3.7	3.7	3.5	**2.7**	3.4	(1+1)-ES [1]
PSO	**1**	**1**	**1.5**	**2.4**	**1.6**	**1.2**	**1.2**	**1.5**	**1.5**	**2.3**	PSO [6]
PSO_Bounds	**1**	**1**	**1.3**	**1.9**	108	46	38	38	28	29	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1.1**	**1.4**	**1.8**	3.2	8.8	24	31	540	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1.9**	4.7	3.3	3.0	**2.8**	4.4	3.6	5.6	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1**	73	59	29	25	24	17	16	VNS (Garcia) [10]

Table 29: Running time excess ERT/ERT$_{\text{best}}$ on f_{129} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

129 Gallagher unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.50	0.50	0.90	33	110	261	951	1622	2972	5330	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1.1**	**1.1**	**1.5**	**1.9**	**1.4**	**1.5**	**1.2**	**1.2**	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.4**	57	48	41	14	14	10	6.1	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.3**	5.9	21	21	30	17	*16e-2/2e3*	.	BayEDAcG [9]
BFGS	**1**	**1**	8.0	5.2	5.4	15	13	*39e-3/800*	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1.2**	10	7.2	7.7	3.1	**2.4**	**2.4**	6.3	(1+1)-CMA-ES [2]
DASA	**1**	**1**	18	87	118	80	36	40	48	132	DASA [17]
DEPSO	**1**	**1**	**1.3**	3.8	4.1	3.3	**2.6**	5.5	*93e-5/2e3*	.	DEPSO [11]
EDA-PSO	**1**	**1**	**1.2**	**1.8**	**1.0**	**1**	**1**	**1.4**	**1.2**	**1**	EDA-PSO [5]
full NEWUOA	**1**	**1**	32	38	18	59	22	18	32	*14e-3/7e3*	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.5**	**1.0**	**1.2**	**2.0**	**1.2**	**1.1**	**1**	5.1	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**1.1**	56	30	31	11	12	9.3	5.8	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**2.7**	20	37	35	11	11	5.8	3.3	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.2**	**1**	**1.2**	**1.9**	**1.9**	**1.8**	**1.5**	**1.7**	MA-LS-Chain [18]
MCS	**1**	**1**	**1.6**	3.2	**2.1**	**2.9**	**2.1**	4.8	7.7	*27e-7/3e4*	MCS [15]
(1+1)-ES	**1**	**1**	**1.4**	7.3	6.1	7.9	**3.0**	**2.6**	3.8	6.1	(1+1)-ES [1]
PSO	**1**	**1**	**1.4**	221	144	62	29	28	15	11	PSO [6]
PSO_Bounds	**1**	**1**	**1.6**	**1.2**	66	140	53	32	18	10	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1.1**	**1.0**	**1**	**1.3**	**1.6**	**2.6**	3.5	21	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1.3**	3.6	**2.7**	**1.9**	**1.3**	**1**	**1.0**	**1.6**	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1**	17	48	23	11	6.7	4.7	**3.0**	VNS (Garcia) [10]

Table 30: Running time excess ERT/ERT$_{\text{best}}$ on f_{130} in **02-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

130 Gallagher Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.50	0.50	0.77	23	99	248	399	824	886	2221	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1.7**	**1**	**1**	**1.5**	**1.5**	**1.3**	4.1	15	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.2**	45	39	16	17	17	20	8.1	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.3**	**2.9**	9.0	11	10	7.9	10	13	BayEDAcG [9]
BFGS	**1**	**1**	13	22	15	14	12	12	20	25	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1.6**	11	4.3	**1.8**	3.1	3.1	4.0	4.7	(1+1)-CMA-ES [2]
DASA	**1**	**1**	60	85	88	67	63	124	323	699	DASA [17]
DEPSO	**1**	**1**	**2.0**	**2.3**	**2.6**	**1.8**	**1.8**	**1.2**	**2.5**	**2.3**	DEPSO [11]
EDA-PSO	**1**	**1**	**1.6**	**2.0**	**2.5**	6.2	7.3	15	21	141	EDA-PSO [5]
full NEWUOA	**1**	**1**	**2.3**	10	5.0	3.1	3.9	**2.1**	3.8	6.2	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.3**	**2.3**	**1.4**	**1.5**	**1.4**	**1**	**1**	**1.1**	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**1.5**	86	72	38	27	22	21	13	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1**	7.8	14	7.9	5.9	**2.9**	**2.8**	**1.1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.5**	**2.4**	**1.6**	**2.1**	**2.2**	**1.7**	**2.1**	**1**	MA-LS-Chain [18]
MCS	**1**	**1**	**1.7**	**2.2**	**1.1**	**1**	**1**	4.3	17	50	MCS [15]
(1+1)-ES	**1**	**1**	**2.2**	6.8	4.1	**2.4**	**2.5**	3.1	3.9	6.0	(1+1)-ES [1]
PSO	**1**	**1**	**1.7**	334	111	111	148	107	112	70	PSO [6]
PSO_Bounds	**1**	**1**	**1.7**	**2.0**	157	203	171	109	134	83	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1.3**	**1.6**	**1.5**	**2.1**	4.1	4.0	15	38	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1**	**2.4**	**1.4**	**1.1**	**2.0**	**2.1**	8.1	7.4	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1.2**	156	60	34	24	14	17	11	VNS (Garcia) [10]

Table 31: Running time excess ERT/ERT_{best} on f_{101} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

101 Sphere moderate Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT_{best}/D	0.33	0.33	1.2	4.4	6.3	6.7	9.3	11	11	13	ERT_{best}/D
ALPS-GA	**1**	**1.1**	3.2	21	59	114	132	163	194	243	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**2.8**	5.3	7.3	10	10	11	12	15	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**2.8**	52	134	231	217	199	196	227	BayEDAcG [9]
BFGS	**1**	**1**	162	795	4125	*46e-2/4e3*	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	3.1	3.1	3.6	4.8	4.4	5.0	5.5	6.5	(1+1)-CMA-ES [2]
DASA	**1**	**1.2**	54	25	31	33	32	35	40	42	DASA [17]
DEPSO	**1**	**1.1**	3.9	11	17	24	25	28	34	40	DEPSO [11]
EDA-PSO	**1**	**1.1**	**1.3**	7.3	12	24	41	69	97	149	EDA-PSO [5]
full NEWUOA	**1**	**1**	4.1	**1.7**	**1.4**	**1.4**	**1.1**	**1**	**1**	**1**	full NEWUOA [22]
GLOBAL	**1**	**1.1**	**2.9**	17	16	16	12	11	11	10	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**3.0**	**2.9**	4.4	6.4	6.3	6.8	8.1	10	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.1**	3.1	**2.8**	4.4	6.5	5.9	6.9	7.7	9.3	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.1**	**2.5**	8.2	15	23	20	19	20	20	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1.4**	**2.3**	**2.0**	242	1648	*96e-7/2e4*	MCS [15]
(1+1)-ES	**1**	**1.5**	**3.0**	**3.0**	3.5	4.7	4.4	**4.5**	**5.2**	**6.2**	(1+1)-ES [1]
PSO	**1**	**1**	**1.7**	7.7	18	39	44	56	71	97	PSO [6]
PSO_Bounds	**1**	**1**	**1.9**	7.7	30	106	132	178	225	298	PSO_Bounds [7]
Monte Carlo	**1**	**1.2**	**1.9**	16	357	11151	2.66e5	1.34e6	*17e-4/1e6*	.	Monte Carlo [3]
SNOBFIT	**1**	**1.1**	**1.8**	**1.1**	**1**	**1**	**1**	**1.2**	**1.5**	**1.7**	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**2.6**	8.5	10	12	11	11	12	13	VNS (Garcia) [10]

Table 32: Running time excess ERT/ERT$_{\text{best}}$ on f_{102} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

102 Sphere moderate unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.33	0.33	1.2	4.0	7.6	9.3	11	12	13	16	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	3.2	13	54	83	120	146	166	193	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.1**	**2.5**	5.1	5.7	6.5	7.7	9.3	10	11	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.1**	**2.6**	17	115	104	191	182	210	182	BayEDAcG [9]
BFGS	**1**	6.1	139	1486	7169	*11e-1/4e3*	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1.5**	**2.5**	**2.6**	**3.0**	3.4	4.0	4.6	4.8	5.2	(1+1)-CMA-ES [2]
DASA	**1**	6.5	36	29	32	39	38	44	48	52	DASA [17]
DEPSO	**1**	**1**	**1**	11	15	17	21	27	29	33	DEPSO [11]
EDA-PSO	**1**	**1.1**	**2.5**	8.2	11	15	30	63	82	118	EDA-PSO [5]
full NEWUOA	**1**	**1**	3.1	**1.7**	**1.1**	**1**	**1**	**1**	**1**	**1**	full NEWUOA [22]
GLOBAL	**1**	**1**	**2.9**	14	14	12	10	10	9.3	8.1	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**2.2**	3.0	3.2	4.2	5.5	6.6	7.1	7.8	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	3.8	3.5	3.9	4.9	5.1	6.2	6.6	7.2	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.1**	**2.8**	10	12	16	19	19	19	17	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1.4**	38	137	1073	5753	*26e-6/2e4*	MCS [15]
(1+1)-ES	**1**	**1.1**	3.8	3.1	**2.7**	**3.2**	**3.6**	**4.2**	**4.3**	**4.7**	(1+1)-ES [1]
PSO	**1**	**1**	**2.5**	6.8	15	26	37	53	64	80	PSO [6]
PSO_Bounds	**1**	**1**	**2.5**	7.7	19	73	113	158	184	229	PSO_Bounds [7]
Monte Carlo	**1**	**1.1**	**1.5**	11	317	5720	2.96e5	*20e-4/1e6*	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.1**	**1.0**	**1.5**	**1**	**1.2**	**1.4**	**1.6**	**2.0**	**2.2**	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**2.6**	10	10	9.4	9.5	10	10	11	VNS (Garcia) [10]

Table 33: Running time excess ERT/ERT$_{\text{best}}$ on f_{103} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

103 Sphere moderate Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.33	0.33	1.2	4.3	6.4	6.4	6.4	6.6	7.7	14	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**2.6**	19	71	122	200	278	2008	2.45e5	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.1**	4.9	6.4	7.6	13	57	91	342	623	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**2.2**	17	138	309	322	509	441	327	BayEDAcG [9]
BFGS	**1**	**1.3**	3.5	3.7	**2.5**	**2.6**	**2.6**	**2.5**	**2.1**	**1.2**	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	3.4	3.2	4.9	7.8	25	40	66	170	(1+1)-CMA-ES [2]
DASA	**1**	5.1	59	33	49	127	435	2832	16068	1.03e6	DASA [17]
DEPSO	**1**	**1**	**1.9**	12	17	28	64	112	121	194	DEPSO [11]
EDA-PSO	**1**	**1.1**	**1.9**	6.7	11	21	101	730	8046	*69e-7/1e5*	EDA-PSO [5]
full NEWUOA	**1**	**1**	3.5	**1.6**	**1.3**	**1.3**	**2.0**	**3.2**	**2.8**	**1.8**	full NEWUOA [22]
GLOBAL	**1**	**1.1**	**1.9**	12	14	17	20	32	35	33	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.1**	**2.6**	3.5	4.4	6.9	9.3	12	225	814	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	4.5	4.2	5.1	7.6	10	12	13	9.3	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.1**	3.5	7.8	13	23	34	36	35	25	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1.3**	**2.0**	**2.1**	36	87	86	MCS [15]
(1+1)-ES	**1**	**1.1**	3.3	**2.8**	3.7	7.2	14	70	160	877	(1+1)-ES [1]
PSO	**1**	**1**	**2.5**	7.5	18	58	343	1553	23324	*19e-6/1e5*	PSO [6]
PSO_Bounds	**1**	**1.1**	**2.3**	6.1	31	95	247	4818	28143	*14e-6/1e5*	PSO_Bounds [7]
Monte Carlo	**1**	**1**	3.4	18	316	12121	5.33e5	*14e-4/1e6*	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.1**	**2.3**	**1.1**	**1**	**1**	**1**	**1**	**1**	**1**	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**2.6**	9.4	12	14	16	19	20	13	VNS (Garcia) [10]

Table 34: Running time excess ERT/ERT$_{\text{best}}$ on f_{104} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

104 Rosenbrock moderate Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	1.4	7.2	10	69	201	212	216	218	219	223	ERT$_{\text{best}}$/D
ALPS-GA	**1.6**	3.9	21	11	9.1	21	29	37	46	62	ALPS-GA [14]
AMaLGaM IDEA	**2.6**	**2.3**	3.3	**1.8**	**1.3**	**1.6**	**1.8**	**2.0**	**2.2**	**2.4**	AMaLGaM IDEA [4]
BayEDAcG	**2.5**	**2.6**	7.5	18	141	*76e-2/2e3*	.	.	.	.	BayEDAcG [9]
BFGS	159	156	3210	*28e+0/2e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**2.9**	**1.3**	**2.0**	**2.7**	**1.9**	**2.2**	**2.4**	**2.4**	**2.4**	**2.5**	(1+1)-CMA-ES [2]
DASA	44	15	27	21	48	138	325	658	2905	*36e-7/1e6*	DASA [17]
DEPSO	4.8	5.2	8.7	4.1	4.9	9.2	44	137	*28e-4/2e3*	.	DEPSO [11]
EDA-PSO	3.0	**2.6**	7.1	14	17	33	44	60	78	111	EDA-PSO [5]
full NEWUOA	4.1	**1.8**	**1.7**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	full NEWUOA [22]
GLOBAL	**2.0**	5.7	10	**1.7**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.1**	GLOBAL [19]
iAMaLGaM IDEA	**1.8**	**1.4**	**2.3**	13	5.0	5.0	5.1	5.2	5.3	5.4	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	4.0	**1.9**	**2.6**	**1.7**	5.4	5.3	5.4	5.4	5.5	5.5	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	3.9	3.1	5.8	**2.6**	3.1	3.4	3.8	4.1	4.4	4.5	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	7.5	39	556	*30e-3/2e4*	.	.	.	MCS [15]
(1+1)-ES	3.6	**1.5**	**1.8**	**2.6**	6.6	20	37	179	513	2908	(1+1)-ES [1]
PSO	**2.3**	**2.2**	6.3	5.5	6.5	15	26	42	60	101	PSO [6]
PSO_Bounds	3.2	**2.1**	10	11	45	266	392	783	800	856	PSO_Bounds [7]
Monte Carlo	3.7	6.1	47	167	2671	*43e-3/1e6*	.	.	.	.	Monte Carlo [3]
SNOBFIT	**2.5**	**1.1**	**1.8**	7.4	13	55	114	*12e-2/2e3*	.	.	SNOBFIT [16]
VNS (Garcia)	**2.5**	6.0	6.6	**2.4**	**1.3**	**1.5**	**1.7**	**1.7**	**1.8**	**1.9**	VNS (Garcia) [10]

Table 35: Running time excess ERT/ERT$_{\text{best}}$ on f_{105} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

105 Rosenbrock moderate unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	1.4	5.6	9.3	181	357	1076	1082	1087	1090	1099	ERT$_{\text{best}}$/D
ALPS-GA	4.2	7.7	28	4.5	4.7	**2.9**	4.5	6.4	8.0	11	ALPS-GA [14]
AMaLGaM IDEA	3.7	**2.5**	3.2	3.2	**2.8**	**1.4**	**1.4**	**1.5**	**1.5**	**1.6**	AMaLGaM IDEA [4]
BayEDAcG	3.5	3.3	26	14	*10e-1/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	157	130	911	*20e+0/2e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**2.7**	**1.6**	**2.1**	**1.3**	3.4	**1.9**	4.9	7.8	10	10	(1+1)-CMA-ES [2]
DASA	69	24	22	14	34	32	94	300	709	4359	DASA [17]
DEPSO	4.3	5.0	7.7	**1.1**	**2.5**	**2.1**	8.6	27	*71e-4/2e3*	.	DEPSO [11]
EDA-PSO	3.2	3.9	6.9	5.5	9.1	6.1	9.0	12	16	23	EDA-PSO [5]
full NEWUOA	4.6	**1.7**	**1.4**	**1.1**	3.0	4.7	6.7	14	21	45	full NEWUOA [22]
GLOBAL	**2.5**	3.7	11	**1**	**1**	**1**	**1**	**1**	**1**	**1**	GLOBAL [19]
iAMaLGaM IDEA	**2.5**	**1.5**	**2.1**	4.6	3.7	**1.3**	**1.3**	**1.3**	**1.3**	**1.4**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	5.1	**2.7**	**2.8**	3.4	5.2	**1.8**	**2.0**	**2.0**	**2.0**	**2.0**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	3.1	5.3	7.1	**1.4**	11	4.8	5.2	5.4	5.4	5.4	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	4.2	37	104	*57e-3/2e4*	.	.	.	MCS [15]
(1+1)-ES	6.1	3.2	**2.8**	**1.5**	3.9	5.0	12	38	102	1498	(1+1)-ES [1]
PSO	4.4	**2.7**	10	46	29	13	20	25	31	42	PSO [6]
PSO_Bounds	**1.7**	5.5	14	43	27	51	54	74	79	84	PSO_Bounds [7]
Monte Carlo	**2.2**	7.8	50	82	1407	6268	*45e-3/1e6*	.	.	.	Monte Carlo [3]
SNOBFIT	3.8	**2.0**	**1.8**	**1.6**	10	11	10	*16e-2/2e3*	.	.	SNOBFIT [16]
VNS (Garcia)	**2.5**	8.0	7.9	11	8.5	3.4	3.7	4.5	5.7	8.1	VNS (Garcia) [10]

Table 36: Running time excess ERT/ERT$_{\text{best}}$ on f_{106} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

106 Rosenbrock moderate Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	1.4	7.2	10	23	52	148	253	276	431	482	ERT$_{\text{best}}$/D
ALPS-GA	**2.4**	5.0	21	29	37	25	55	241	1875	*37e-7/2e6*	ALPS-GA [14]
AMaLGaM IDEA	**2.9**	**1.9**	3.7	18	30	34	31	32	27	43	AMaLGaM IDEA [4]
BayEDAcG	3.8	3.6	7.5	32	*73e-2/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	18	6.6	12	18	23	13	8.0	7.6	7.6	7.6	BFGS [21]
(1+1)-CMA-ES	**1.7**	**1.0**	**1.9**	5.5	6.1	6.2	7.2	11	19	97	(1+1)-CMA-ES [2]
DASA	21	11	14	150	192	267	545	6576	*10e-5/1e6*	.	DASA [17]
DEPSO	4.6	3.1	11	12	34	200	*38e-3/2e3*	.	.	.	DEPSO [11]
EDA-PSO	4.9	**3.0**	7.6	44	69	52	461	1572	3326	*97e-5/1e5*	EDA-PSO [5]
full NEWUOA	4.2	**1.2**	**1.2**	**1**	**1**	**1**	**1**	**1**	**1.4**	**1.6**	full NEWUOA [22]
GLOBAL	**2.2**	3.8	9.4	6.8	**3.8**	**2.1**	**1.3**	**2.5**	3.7	16	GLOBAL [19]
iAMaLGaM IDEA	3.5	**1.4**	**2.4**	37	41	24	22	31	25	51	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	3.7	**1.7**	**2.9**	7.5	7.1	3.0	**1.9**	**1.8**	**1.2**	**1.2**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	3.4	4.2	6.4	8.3	7.0	3.4	**2.4**	**2.3**	**1.6**	**1.6**	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	23	225	812	982	*40e-3/2e4*	.	.	MCS [15]
(1+1)-ES	3.4	**2.2**	**2.1**	**3.5**	24	32	104	238	1239	30170	(1+1)-ES [1]
PSO	**2.4**	3.4	8.0	14	235	912	1703	5419	*14e-3/1e5*	.	PSO [6]
PSO_Bounds	**2.2**	3.7	11	33	174	620	477	1511	*17e-4/1e5*	.	PSO_Bounds [7]
Monte Carlo	4.9	7.6	43	587	9143	*42e-3/1e6*	.	.	.	.	Monte Carlo [3]
SNOBFIT	**2.9**	**1.5**	**1.9**	**3.6**	63	159	*12e-2/2e3*	.	.	.	SNOBFIT [16]
VNS (Garcia)	**2.5**	6.4	7.1	8.1	**5.6**	**2.3**	**1.5**	**1.5**	**1**	**1**	VNS (Garcia) [10]

Table 37: Running time excess ERT/ERT$_{\text{best}}$ on f_{107} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

107 Sphere Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.33	0.33	2.0	16	90	122	350	487	525	633	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.1**	**2.1**	4.3	5.1	8.2	4.4	4.7	5.3	6.4	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.7**	**1.6**	4.4	3.7	**1.4**	**2.7**	**2.6**	**2.3**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**2.3**	4.2	**2.2**	3.9	**2.1**	**1.9**	**2.3**	**2.7**	BayEDAcG [9]
BFGS	**1**	**1**	87	314	*10e-1/3e3*	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	17	10	7.6	10	5.9	9.0	20	51	(1+1)-CMA-ES [2]
DASA	**1**	**1.5**	283	556	800	3144	8179	25979	*24e-4/8e5*	.	DASA [17]
DEPSO	**1**	**1.2**	**2.4**	3.2	**1.4**	**2.2**	**1.0**	**1.0**	**1.2**	**1.3**	DEPSO [11]
EDA-PSO	**1**	**1.1**	**1.6**	**2.2**	3.5	15	10	10	12	15	EDA-PSO [5]
full NEWUOA	**1**	**1**	25	21	22	54	41	98	195	*28e-4/7e3*	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.6**	4.8	3.7	7.0	6.7	11	10	*66e-4/700*	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	3.4	16	8.2	14	5.1	4.2	3.9	4.0	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	58	8.0	**2.9**	**2.4**	**1**	**1.2**	**1.3**	**1.4**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.2**	**1.6**	3.0	**2.3**	3.7	**1.8**	**1.6**	**1.6**	**1.6**	MA-LS-Chain [18]
MCS	**1**	**1**	**2.4**	**1**	7.3	51	208	*16e-4/2e4*	.	.	MCS [15]
(1+1)-ES	**1**	**1.1**	13	17	7.8	11	8.5	18	59	280	(1+1)-ES [1]
PSO	**1**	**1.1**	**1.2**	**1.5**	**1.2**	**2.7**	**1.7**	**1.7**	**2.0**	**2.6**	PSO [6]
PSO_Bounds	**1**	**1.1**	**1**	**2.9**	3.1	6.6	4.5	5.1	6.4	7.9	PSO_Bounds [7]
Monte Carlo	**1**	**1.1**	**2.0**	4.3	33	622	6844	*16e-4/1e6*	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	**2.5**	3.6	3.4	5.0	**2.7**	3.5	4.7	12	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1.6**	**2.3**	**1**	**1**	**1.3**	**1**	**1**	**1**	VNS (Garcia) [10]

Table 38: Running time excess ERT/ERT$_{\text{best}}$ on f_{108} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

108 Sphere unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.33	0.33	1.9	33	655	2488	5423	10054	15634	33271	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.1**	**1.4**	**1.7**	**1.8**	**1.1**	**1.2**	**1.0**	**1**	**1**	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.3**	45	11	6.8	8.4	7.4	6.8	10	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.1**	**2.4**	25	*64e-2/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	38	32	*92e-2/800*	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	72	21	7.2	18	*42e-3/1e4*	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	11	512	351	229	488	2274	*99e-4/8e5*	.	.	DASA [17]
DEPSO	**1**	**1**	4.4	6.0	6.0	*11e-2/2e3*	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1.1**	**1.5**	**1.9**	**1.0**	**1.6**	**1.7**	**2.5**	**2.6**	**2.1**	EDA-PSO [5]
full NEWUOA	**1**	15	82	179	50	*31e-2/7e3*	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**2.1**	4.8	**2.6**	7.4	*92e-3/1e3*	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	92	57	20	12	11	16	16	33	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	178	44	7.0	4.5	**2.4**	15	*91e-5/1e4*	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.9**	**2.8**	**1.0**	**1**	**1**	**1**	**1.8**	**6.6**	MA-LS-Chain [18]
MCS	**1**	**1**	3.2	3.9	8.8	100	*37e-3/2e4*	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	24	39	13	32	185	*53e-5/1e6*	.	.	(1+1)-ES [1]
PSO	**1**	**1**	**1**	**1**	13	8.6	7.2	5.4	8.5	14	PSO [6]
PSO_Bounds	**1**	**1.1**	**2.2**	**2.6**	**1**	16	24	23	15	21	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1.1**	3.1	**2.7**	27	245	*92e-5/1e6*	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1.5**	4.2	4.0	10	*11e-2/2e3*	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1.6**	69	10	6.3	8.3	11	54	158	VNS (Garcia) [10]

Table 39: Running time excess ERT/ERT$_{\text{best}}$ on f_{109} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

109 Sphere Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.33	0.33	1.2	6.8	31	48	64	65	84	84	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.1**	**2.1**	13	15	36	634	12750	1.45e5	*42e-6/2e6*	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.1**	3.3	38	9.3	25	52	92	122	209	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**2.4**	27	36	25	21	25	21	36	BayEDAcG [9]
BFGS	**1**	9.3	39	8.7	**2.1**	**1.3**	**1**	**1**	**1**	**1**	BFGS [21]
(1+1)-CMA-ES	**1**	**1.2**	**2.9**	5.5	**2.6**	47	409	*18e-4/1e4*	.	.	(1+1)-CMA-ES [2]
DASA	**1**	3.1	196	403	1749	10809	1.97e5	*63e-4/9e5*	.	.	DASA [17]
DEPSO	**1**	**1**	3.1	6.4	4.2	7.0	14	76	349	*15e-5/2e3*	DEPSO [11]
EDA-PSO	**1**	**1**	**2.0**	3.8	**3.0**	111	1408	*83e-5/1e5*	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	6.4	**2.1**	**1.4**	**1.6**	**1.7**	**2.2**	**1.7**	**1.7**	full NEWUOA [22]
GLOBAL	**1**	**1.2**	4.5	10	3.7	4.6	25	*39e-4/500*	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.1**	**2.5**	**2.0**	8.1	18	47	79	143	486	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	3.4	**1.8**	**1**	**1**	**1.7**	**2.4**	**2.5**	**3.6**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.1**	3.3	5.4	3.1	5.8	10	20	26	56	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	18	81	114	145	156	187	MCS [15]
(1+1)-ES	**1**	**1**	3.8	**1.9**	3.3	27	384	2212	81511	*25e-6/1e6*	(1+1)-ES [1]
PSO	**1**	**1**	**2.2**	8.4	12	285	2937	7324	17531	*19e-4/1e5*	PSO [6]
PSO_Bounds	**1**	**1.1**	**2.2**	3.7	12	3138	22175	22842	*18e-3/1e5*	.	PSO_Bounds [7]
Monte Carlo	**1**	**1.1**	**1.6**	9.5	103	2503	48242	*19e-4/1e6*	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.1**	**2.6**	**1.1**	**2.5**	17	60	384	*31e-4/2e3*	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**2.6**	5.9	**2.4**	**2.1**	**2.4**	3.1	**3.0**	4.2	VNS (Garcia) [10]

Table 40: Running time excess ERT/ERT$_{\text{best}}$ on f_{110} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

110 Rosenbrock Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	1.4	8.4	19	307	2092	6819	11776	24266	33153	52108	ERT$_{\text{best}}$/D
ALPS-GA	**2.3**	3.9	9.5	**2.6**	**1**	**1.2**	**1**	**1**	**1**	**1**	ALPS-GA [14]
AMaLGaM IDEA	**2.7**	**1.8**	**2.2**	8.4	33	26	16	7.7	5.7	3.6	AMaLGaM IDEA [4]
BayEDAcG	**2.3**	**3.0**	7.8	4.8	14	4.2	*60e-2/2e3*	.	.	.	BayEDAcG [9]
BFGS	50	59	222	*19e+0/1e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	8.1	5.8	6.7	**2.5**	**2.2**	3.7	13	*17e-3/1e4*	.	.	(1+1)-CMA-ES [2]
DASA	412	229	269	115	173	179	240	532	*43e-4/9e5*	.	DASA [17]
DEPSO	6.9	4.4	5.1	**1**	**1.9**	**1**	**2.5**	*16e-2/2e3*	.	.	DEPSO [11]
EDA-PSO	**2.4**	**2.1**	3.9	4.3	43	*98e-3/1e5*	.	.	.	.	EDA-PSO [5]
full NEWUOA	53	20	15	10	8.5	7.4	8.8	*20e-2/7e3*	.	.	full NEWUOA [22]
GLOBAL	4.2	3.5	6.5	**1.6**	**1.7**	*91e-2/400*	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**2.2**	**1.2**	**1.6**	8.4	8.5	11	10	4.9	**3.6**	**2.3**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	3.8	15	7.6	3.9	10	6.1	**3.5**	**2.8**	**2.0**	**2.8**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	3.2	3.8	4.0	**1.1**	6.5	16	9.2	9.2	*76e-3/2e4*	.	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	5.9	8.6	*87e-3/2e4*	.	.	.	.	MCS [15]
(1+1)-ES	6.2	6.3	6.8	**2.7**	**1.6**	**2.0**	4.1	6.0	39	279	(1+1)-ES [1]
PSO	**2.4**	**2.6**	5.3	25	97	59	55	27	45	*21e-2/1e5*	PSO [6]
PSO_Bounds	**2.4**	**2.1**	5.6	26	73	30	35	*25e-2/1e5*	.	.	PSO_Bounds [7]
Monte Carlo	**2.0**	3.2	16	55	203	2076	*32e-3/1e6*	.	.	.	Monte Carlo [3]
SNOBFIT	3.4	**1.6**	**2.9**	4.2	3.4	3.6	*76e-2/2e3*	.	.	.	SNOBFIT [16]
VNS (Garcia)	**2.4**	71	34	20	16	8.4	7.6	**4.4**	4.2	4.6	VNS (Garcia) [10]

Table 41: Running time excess ERT/ERT$_{\text{best}}$ on f_{111} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

111 Rosenbrock unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	3.4	17	58	1158	9991	25295	64938	2.00e5	5.76e5	3.00e6	ERT$_{\text{best}}$/D
ALPS-GA	**1.8**	**2.1**	4.8	**1.3**	**1**	**1**	**1**	**1**	**1**	**1**	ALPS-GA [14]
AMaLGaM IDEA	**1.1**	**1.4**	**1**	4.2	7.0	16	22	**9.1**	**7.6**	**4.8**	AMaLGaM IDEA [4]
BayEDAcG	**1.7**	4.6	45	11	*15e+0/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	15	12	150	*25e+0/600*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	20	16	17	9.3	15	*89e-2/1e4*	.	.	.	.	(1+1)-CMA-ES [2]
DASA	309	312	352	251	207	*29e-2/8e5*	.	.	.	.	DASA [17]
DEPSO	**2.1**	**2.1**	4.2	3.4	*12e-1/2e3*	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1.0**	**1.1**	5.0	**2.9**	19	57	*15e-2/1e5*	.	.	.	EDA-PSO [5]
full NEWUOA	79	73	96	25	*76e-1/7e3*	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1.2**	**1.9**	4.3	3.0	**2.0**	*25e-1/1e3*	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1.1**	18	32	11	13	13	12	16	**12**	**4.9**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**2.9**	26	24	5.1	4.5	**5.9**	*47e-2/1e4*	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1.5**	**2.0**	**2.4**	**1**	**1.7**	8.9	*52e-3/2e4*	.	.	.	MA-LS-Chain [18]
MCS	**2.2**	**2.4**	7.4	7.5	5.3	*47e-2/2e4*	.	.	.	.	MCS [15]
(1+1)-ES	17	12	11	5.3	8.7	36	*64e-4/1e6*	.	.	.	(1+1)-ES [1]
PSO	**1.1**	**1**	**1.8**	11	8.4	16	10	**3.4**	*87e-3/1e5*	.	PSO [6]
PSO_Bounds	**1.3**	**1.4**	**2.9**	**1.6**	4.5	8.9	**10**	*25e-3/1e5*	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**2.4**	8.9	19	80	*75e-3/1e6*	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1.8**	**1.9**	8.6	6.4	*37e-1/2e3*	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1.0**	27	46	6.0	6.4	**8.1**	**9.3**	16	23	*13e-6/9e6*	VNS (Garcia) [10]

Table 42: Running time excess ERT/$\mathrm{ERT}_{\mathrm{best}}$ on f_{112} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

112 Rosenbrock Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
$\mathrm{ERT}_{\mathrm{best}}$/D	1.4	7.2	10	191	651	877	950	993	1035	1178	$\mathrm{ERT}_{\mathrm{best}}$/D
ALPS-GA	4.3	8.1	27	4.4	4.2	35	1364	11894	*55e-5/2e6*	.	ALPS-GA [14]
AMaLGaM IDEA	**2.5**	**2.2**	4.0	7.2	19	59	80	89	138	**171**	AMaLGaM IDEA [4]
BayEDAcG	3.3	3.1	7.7	13	*10e-1/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	39	47	70	25	*11e-1/3e3*	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	3.9	**1.8**	3.3	**1.5**	5.1	27	*18e-3/1e4*	.	.	.	(1+1)-CMA-ES [2]
DASA	39	52	90	36	70	1164	7026	14223	*48e-4/1e6*	.	DASA [17]
DEPSO	5.3	3.1	7.8	**2.1**	13	*42e-2/2e3*	.	.	.	.	DEPSO [11]
EDA-PSO	3.5	**2.8**	6.1	3.8	49	1673	*39e-3/1e5*	.	.	.	EDA-PSO [5]
full NEWUOA	4.3	**1.3**	**2.2**	**1**	4.5	12	49	*13e-3/7e3*	.	.	full NEWUOA [22]
GLOBAL	**2.5**	4.5	11	**1.2**	**1.9**	*30e-2/400*	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	3.0	**1.6**	**2.4**	**2.9**	41	54	74	100	142	202	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**2.3**	**1.5**	**2.7**	**1.5**	**1**	**1.0**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	3.3	4.0	6.9	**1.0**	**2.2**	**5.8**	**18**	**44**	**95**	*60e-5/2e4*	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	6.6	40	*12e-2/2e4*	.	.	.	.	MCS [15]
(1+1)-ES	4.3	**2.2**	**2.5**	**1.3**	**2.6**	21	315	3283	*30e-5/1e6*	.	(1+1)-ES [1]
PSO	**2.6**	**3.0**	7.7	45	318	322	*20e-2/1e5*	.	.	.	PSO [6]
PSO_Bounds	3.7	**2.5**	12	4.6	140	184	1509	*72e-3/1e5*	.	.	PSO_Bounds [7]
Monte Carlo	3.4	9.0	41	95	772	7826	*60e-3/1e6*	.	.	.	Monte Carlo [3]
SNOBFIT	**2.5**	**1.1**	**2.2**	3.5	4.9	28	*17e-2/2e3*	.	.	.	SNOBFIT [16]
VNS (Garcia)	**2.5**	6.5	7.9	**1.9**	**1.1**	**1**	**1.0**	**1.1**	**1.1**	**1.0**	VNS (Garcia) [10]

Table 43: Running time excess ERT/ERT$_{\text{best}}$ on f_{113} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

113 Step-ellipsoid Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.33	1.1	8.8	42	649	1031	1079	1079	1079	1143	ERT$_{\text{best}}$/D
ALPS-GA	**1.3**	**1.7**	3.1	7.2	**1.5**	**1.8**	**2.1**	**2.1**	**2.1**	**2.2**	ALPS-GA [14]
AMaLGaM IDEA	**1.5**	**2.0**	**1.1**	**1**	**1.9**	**2.1**	**2.0**	**2.0**	**2.0**	**1.9**	AMaLGaM IDEA [4]
BayEDAcG	**1.4**	**1**	**1.8**	**2.8**	3.4	8.5	8.2	8.2	8.2	8.0	BayEDAcG [9]
BFGS	7.1	43	95	706	*19e-1/2e3*	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1.3**	**1.8**	16	12	**2.5**	6.8	22	22	22	22	(1+1)-CMA-ES [2]
DASA	5.7	172	224	526	116	795	1024	1024	1024	1364	DASA [17]
DEPSO	**1.2**	**2.9**	3.3	**2.9**	**1**	**1**	**1**	**1**	**1**	**1**	DEPSO [11]
EDA-PSO	**1.3**	**2.1**	**2.2**	3.7	**2.4**	3.6	3.7	3.7	3.7	4.4	EDA-PSO [5]
full NEWUOA	**1.5**	7.5	10	14	7.7	16	95	95	95	*15e-3/7e3*	full NEWUOA [22]
GLOBAL	**1.5**	**2.6**	**1.8**	3.9	**2.3**	4.2	*12e-2/400*	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1.2**	**1.5**	25	17	4.8	4.6	4.6	4.6	4.6	4.4	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1.9**	4.2	26	16	3.5	**3.0**	**2.9**	**2.9**	**2.9**	3.1	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1.3**	**1.9**	**1.8**	3.6	**2.4**	**2.0**	**2.1**	**2.1**	**2.1**	**2.1**	MA-LS-Chain [18]
MCS	**1**	**2.1**	**2.3**	**2.7**	3.8	50	225	225	225	*15e-3/2e4*	MCS [15]
(1+1)-ES	**1.9**	16	11	7.3	**2.1**	14	23	23	23	28	(1+1)-ES [1]
PSO	**1.3**	**1.7**	**1.4**	3.7	**1.2**	10	12	12	12	11	PSO [6]
PSO_Bounds	**1.3**	**1.3**	**1.6**	**2.9**	**1.6**	**2.3**	**2.6**	**2.6**	**2.6**	**2.8**	PSO_Bounds [7]
Monte Carlo	**1.3**	**1.4**	**3.0**	17	28	519	1315	1315	1315	4165	Monte Carlo [3]
SNOBFIT	**1.2**	**1.1**	**1**	8.0	4.7	6.9	6.6	6.6	6.6	6.2	SNOBFIT [16]
VNS (Garcia)	**1**	**2.5**	3.1	11	5.8	6.2	6.8	6.8	6.8	6.4	VNS (Garcia) [10]

Table 44: Running time excess ERT/ERT$_{\text{best}}$ on f_{114} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

114 Step-ellipsoid unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.33	0.98	8.5	338	2093	6295	9834	9834	9834	14623	ERT$_{\text{best}}$/D
ALPS-GA	**1.2**	**2.0**	**2.4**	**1.4**	**1.1**	**1.4**	**1.1**	**1.1**	**1.1**	**1.1**	ALPS-GA [14]
AMaLGaM IDEA	**1.3**	**1.8**	**2.9**	8.5	7.1	4.8	3.3	3.3	3.3	**2.3**	AMaLGaM IDEA [4]
BayEDAcG	**1.2**	**2.0**	19	12	*18e-1/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	3.4	34	20	34	*26e-1/800*	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1.1**	18	27	5.3	12	*17e-2/1e4*	.	.	.	.	(1+1)-CMA-ES [2]
DASA	16	163	536	115	524	942	1262	1262	1262	849	DASA [17]
DEPSO	**1.3**	**1**	3.5	**2.5**	4.5	4.8	3.0	3.0	3.0	*22e-2/2e3*	DEPSO [11]
EDA-PSO	**1.3**	**1.7**	**2.8**	**1.1**	**2.6**	**2.9**	3.9	3.9	3.9	4.6	EDA-PSO [5]
full NEWUOA	**1.5**	65	96	41	50	*13e-1/7e3*	.	.	.	.	full NEWUOA [22]
GLOBAL	**1.5**	**1.6**	**2.5**	**1.1**	**2.8**	*34e-2/1e3*	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1.4**	**1.6**	121	17	13	8.8	5.8	5.8	5.8	4.1	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1.2**	112	27	8.5	**2.3**	**2.1**	**1.9**	**1.9**	**1.9**	**1.9**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1.1**	**1.8**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	MA-LS-Chain [18]
MCS	**1**	**1.9**	4.9	3.6	8.1	*93e-3/2e4*	.	.	.	.	MCS [15]
(1+1)-ES	20	55	25	8.1	14	46	49	49	49	168	(1+1)-ES [1]
PSO	**1.4**	**2.3**	5.0	45	27	45	29	29	29	45	PSO [6]
PSO_Bounds	**1**	**2.1**	**1.8**	22	33	20	17	17	17	15	PSO_Bounds [7]
Monte Carlo	**1.2**	**2.1**	**1.8**	**2.1**	12	107	123	123	123	990	Monte Carlo [3]
SNOBFIT	**1.3**	**2.5**	**2.3**	5.7	12	*75e-2/2e3*	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**2.9**	53	13	10	7.9	13	13	13	11	VNS (Garcia) [10]

Table 45: Running time excess ERT/ERT$_{\text{best}}$ on f_{115} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

115 Step-ellipsoid Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.33	0.93	4.0	39	198	280	297	297	297	415	ERT$_{\text{best}}$/D
ALPS-GA	**1.1**	**2.1**	6.6	7.8	4.0	49	66	66	66	204	ALPS-GA [14]
AMaLGaM IDEA	**1.3**	**1.6**	3.0	**1**	4.7	6.8	8.2	8.2	8.2	6.9	AMaLGaM IDEA [4]
BayEDAcG	**1.1**	**2.0**	4.2	7.9	31	48	96	96	96	69	BayEDAcG [9]
BFGS	11	68	186	*50e-1/2e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1.8**	**2.2**	4.6	4.8	4.7	30	49	49	49	78	(1+1)-CMA-ES [2]
DASA	5.0	108	365	479	873	5337	13980	13980	13980	*11e-3/9e5*	DASA [17]
DEPSO	**1.6**	4.8	7.1	3.4	5.0	5.2	**6.1**	**6.1**	**6.1**	**6.5**	DEPSO [11]
EDA-PSO	**1.1**	**2.4**	3.4	**2.6**	41	103	321	321	321	486	EDA-PSO [5]
full NEWUOA	**1.9**	**2.6**	**1.3**	**1.8**	**2.7**	15	26	26	26	28	full NEWUOA [22]
GLOBAL	**1.5**	**1.6**	3.7	4.6	3.8	31	*41e-3/600*	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1.3**	**1.6**	**2.1**	12	7.1	8.0	10	10	10	8.6	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1.7**	**3.0**	**2.8**	**1.3**	**1**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1.1**	**2.0**	5.5	**2.6**	**1.9**	**4.6**	6.2	6.2	6.2	6.6	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	3.2	48	845	*39e-3/2e4*	.	.	.	MCS [15]
(1+1)-ES	**1.1**	**2.1**	**2.9**	**2.8**	6.1	24	53	53	53	131	(1+1)-ES [1]
PSO	**1.3**	**1.8**	4.2	4.1	96	280	576	576	576	1030	PSO [6]
PSO_Bounds	**1.3**	**1.9**	4.3	393	189	429	571	571	571	412	PSO_Bounds [7]
Monte Carlo	**1**	3.3	6.9	21	59	1713	5133	5133	5133	*32e-4/1e6*	Monte Carlo [3]
SNOBFIT	**1.2**	**1.9**	**1.9**	5.3	11	85	81	81	81	58	SNOBFIT [16]
VNS (Garcia)	**1**	3.0	6.7	**2.5**	**2.2**	**1.9**	**2.0**	**2.0**	**2.0**	**1.5**	VNS (Garcia) [10]

Table 46: Running time excess ERT/ERT$_{\text{best}}$ on f_{116} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

116 Ellipsoid Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	6.2	25	56	881	1473	2051	2381	3153	3205	3790	ERT$_{\text{best}}$/D
ALPS-GA	**1.8**	**2.5**	9.4	**1.6**	**2.9**	3.9	5.3	6.0	9.2	14	ALPS-GA [14]
AMaLGaM IDEA	**1.6**	**1.2**	**1**	**1.7**	**1.4**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1.9**	7.8	24	6.9	10	*49e-1/2e3*	.	.	.	.	BayEDAcG [9]
BFGS	35	36	302	*73e+0/1e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	6.2	6.0	16	6.7	19	72	*23e-2/1e4*	.	.	.	(1+1)-CMA-ES [2]
DASA	140	194	532	281	2798	*19e-2/9e5*	.	.	.	.	DASA [17]
DEPSO	**1.7**	**2.6**	**4.9**	**1.1**	**2.3**	4.5	6.1	*15e-2/2e3*	.	.	DEPSO [11]
EDA-PSO	**1.7**	**2.6**	17	3.5	30	61	171	130	128	109	EDA-PSO [5]
full NEWUOA	32	17	35	14	68	49	*13e-1/7e3*	.	.	.	full NEWUOA [22]
GLOBAL	**2.2**	**2.5**	7.2	**2.8**	3.5	5.7	4.9	*21e-1/700*	.	.	GLOBAL [19]
iAMaLGaM IDEA	**2.1**	**1**	5.3	**1**	**1**	**1.1**	**1.6**	**1.2**	**1.3**	**1.2**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	54	22	22	3.6	3.0	**2.6**	**2.3**	**1.8**	**1.7**	**1.6**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1.8**	**1.9**	8.3	**2.1**	4.4	8.1	14	11	13	29	MA-LS-Chain [18]
MCS	**1.8**	**1.5**	**4.2**	5.3	37	*26e-2/2e4*	.	.	.	.	MCS [15]
(1+1)-ES	11	10	19	7.8	23	70	411	*92e-5/1e6*	.	.	(1+1)-ES [1]
PSO	**1.4**	**1.5**	278	45	124	154	599	456	450	388	PSO [6]
PSO_Bounds	**1.7**	**1.8**	286	102	105	103	280	*31e-2/1e5*	.	.	PSO_Bounds [7]
Monte Carlo	**2.5**	7.0	48	87	1333	*13e-2/1e6*	.	.	.	.	Monte Carlo [3]
SNOBFIT	**2.0**	**3.0**	14	13	8.0	5.8	*24e-1/2e3*	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	4.7	43	10	13	11	15	16	17	15	VNS (Garcia) [10]

Table 47: Running time excess ERT/ERT$_{\text{best}}$ on f_{117} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

117 Ellipsoid unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	6.2	77	797	4787	15776	59393	98360	1.79e5	2.17e5	4.18e5	ERT$_{\text{best}}$/D
ALPS-GA	**1.5**	**1.8**	**1**	**1**	**1**	**1**	**1**	**1.3**	**3.4**	**29**	ALPS-GA [14]
AMaLGaM IDEA	**2.0**	16	5.8	**2.6**	**2.0**	**1.4**	**1.2**	**1.0**	**1.4**	**1.5**	AMaLGaM IDEA [4]
BayEDAcG	**2.5**	12	36	*44e+0/2e3*	.	.	.	.	.	.	BayEDAcG [9]
BFGS	12	7.1	11	*52e+0/600*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	27	6.3	6.0	5.1	*28e-1/1e4*	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	309	111	85	158	365	*49e-2/8e5*	.	.	.	.	DASA [17]
DEPSO	3.3	3.2	4.7	6.1	*12e+0/2e3*	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1.5**	**1.1**	**2.5**	8.9	14	24	14	8.0	*64e-2/1e5*	.	EDA-PSO [5]
full NEWUOA	62	22	22	*17e+0/7e3*	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**2.3**	**2.2**	**2.6**	*11e+0/1e3*	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	20	19	5.8	**2.6**	**2.5**	**1.4**	**1.4**	**1**	**1**	**1**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	57	13	4.2	3.7	10	**2.5**	*12e-1/1e4*	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1.8**	**2.2**	**1.5**	**1.7**	**2.4**	**1.8**	**2.2**	*28e-2/2e4*	.	.	MA-LS-Chain [18]
MCS	**2.0**	**1.1**	**2.0**	8.4	15	*19e-1/2e4*	.	.	.	.	MCS [15]
(1+1)-ES	24	9.0	7.2	7.1	33	54	*43e-3/1e6*	.	.	.	(1+1)-ES [1]
PSO	**2.0**	**1**	13	16	*32e-2/1e5*	.	.	.	.	.	PSO [6]
PSO_Bounds	**2.4**	**1.7**	47	25	19	12	7.1	8.0	*17e-1/1e5*	.	PSO_Bounds [7]
Monte Carlo	**1.4**	**1.4**	3.0	10	297	*17e-2/1e6*	.	.	.	.	Monte Carlo [3]
SNOBFIT	**2.3**	**1.7**	**2.2**	*98e-1/2e3*	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	30	7.4	3.3	7.2	8.7	30	120	287	*19e-5/9e6*	VNS (Garcia) [10]

Table 48: Running time excess ERT/$\mathrm{ERT_{best}}$ on f_{118} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

118 Ellipsoid Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
$\mathrm{ERT_{best}}$/D	4.7	6.8	36	68	237	284	336	392	428	531	$\mathrm{ERT_{best}}$/D
ALPS-GA	3.6	20	14	19	13	282	4122	*83e-5/2e6*	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1.4**	**3.6**	**1.3**	**1**	4.8	6.5	**8.4**	**12**	**20**	**41**	AMaLGaM IDEA [4]
BayEDAcG	**2.7**	30	115	126	*15e+0/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	36	89	60	220	*37e-1/3e3*	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1.6**	4.5	3.1	5.1	7.1	105	*14e-3/1e4*	.	.	.	(1+1)-CMA-ES [2]
DASA	36	241	248	1568	4332	17386	*60e-3/1e6*	.	.	.	DASA [17]
DEPSO	3.4	10	8.1	18	22	*21e-2/2e3*	.	.	.	.	DEPSO [11]
EDA-PSO	**2.8**	10	25	45	161	493	1979	*12e-3/1e5*	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	**1**	**2.7**	5.8	18	135	*58e-4/7e3*	.	.	full NEWUOA [22]
GLOBAL	4.0	12	3.3	**2.8**	**1.8**	13	*27e-3/400*	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1.7**	**2.9**	**1.0**	7.5	4.0	**5.4**	20	30	51	84	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1.8**	7.8	6.5	5.1	**1.7**	**1.6**	**1.7**	**1.6**	**1.6**	**1.4**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**2.3**	7.0	4.8	6.9	4.2	5.8	14	22	32	61	MA-LS-Chain [18]
MCS	**2.4**	7.4	6.3	76	507	*25e-2/2e4*	.	.	.	.	MCS [15]
(1+1)-ES	4.1	7.3	11	20	52	230	3821	17542	*93e-5/1e6*	.	(1+1)-ES [1]
PSO	**2.1**	6.3	10	757	1226	4929	4178	*42e-2/1e5*	.	.	PSO [6]
PSO_Bounds	**2.4**	7.8	12	1012	849	1504	4396	*68e-2/1e5*	.	.	PSO_Bounds [7]
Monte Carlo	**1.8**	18	69	1019	19886	*16e-2/1e6*	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1.5**	6.2	9.2	58	99	*15e-1/2e3*	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1.3**	6.8	3.1	**2.9**	**1**	**1**	**1**	**1**	**1**	**1**	VNS (Garcia) [10]

Table 49: Running time excess ERT/ERT$_{\text{best}}$ on f_{119} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

119 Sum of different powers Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.33	0.33	0.73	22	191	443	668	1894	4013	5240	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.3**	**2.4**	**2.7**	**2.9**	**2.9**	3.4	**2.3**	3.3	58	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.1**	**1.7**	19	**2.4**	**1.2**	4.5	**2.1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.1**	**2.0**	5.8	**1.8**	**1.6**	**2.3**	5.2	*47e-5/2e3*	.	BayEDAcG [9]
BFGS	**1**	5.0	90	93	226	*69e-2/3e3*	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	12	11	5.1	5.0	21	18	*24e-4/1e4*	.	(1+1)-CMA-ES [2]
DASA	**1**	44	280	463	303	1230	18573	*58e-4/9e5*	.	.	DASA [17]
DEPSO	**1**	**1**	**2.1**	**2.4**	**1.1**	**1**	**1**	**1**	**1.8**	*33e-6/2e3*	DEPSO [11]
EDA-PSO	**1**	**1.1**	**1.5**	**1**	**1.9**	6.5	7.9	4.1	**2.5**	128	EDA-PSO [5]
full NEWUOA	**1**	**1.9**	3.9	7.6	13	19	154	*87e-4/7e3*	.	.	full NEWUOA [22]
GLOBAL	**1**	**1.3**	**2.1**	**1.8**	**2.0**	3.4	6.4	*56e-3/600*	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.1**	**2.3**	11	3.5	5.8	5.1	**3.0**	**1.7**	**2.1**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**2.1**	3.9	17	**2.7**	**1.8**	**2.7**	**1.9**	**1.2**	**1.1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.2**	**2.4**	**1.6**	**1.6**	**1.6**	**1.6**	**1.2**	**1.5**	42	MA-LS-Chain [18]
MCS	**1**	**1**	6.6	**1.3**	**2.8**	42	355	125	*94e-4/2e4*	.	MCS [15]
(1+1)-ES	**1**	**2.4**	12	5.2	3.8	10	30	106	424	*11e-6/1e6*	(1+1)-ES [1]
PSO	**1**	**1.2**	**1.6**	**1.6**	**1**	**1.1**	**2.0**	6.2	24	281	PSO [6]
PSO_Bounds	**1**	**1.1**	**2.4**	**1.8**	**1.8**	3.3	4.8	7.4	16	128	PSO_Bounds [7]
Monte Carlo	**1**	**1.1**	**1.4**	**2.6**	24	455	*35e-4/1e6*	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.2**	**2.2**	**2.6**	**2.3**	**2.6**	8.5	6.2	6.2	*38e-4/2e3*	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1**	27	3.5	**2.2**	3.3	3.0	4.1	106	VNS (Garcia) [10]

Table 50: Running time excess ERT/$\mathrm{ERT}_{\mathrm{best}}$ on f_{120} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

120 Sum of different powers unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
$\mathrm{ERT}_{\mathrm{best}}$/D	0.33	0.33	0.73	27	601	4836	15766	76318	4.38e5	1.45e7	$\mathrm{ERT}_{\mathrm{best}}$/D
ALPS-GA	**1**	**1.3**	**2.4**	**2.3**	**2.1**	**1.6**	**1.4**	**1**	**1**	***18e-7/2e6***	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.2**	**2.5**	38	20	8.1	7.8	8.1	7.0	***28e-6/1e6***	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.3**	**1.9**	20	47	*43e-2/2e3*	.	.	.	**.**	BayEDAcG [9]
BFGS	**1**	6.1	48	50	*10e-1/900*	.	.	.	.	**.**	BFGS [21]
(1+1)-CMA-ES	**1**	**2.3**	47	23	8.9	31	*53e-3/1e4*	.	.	**.**	(1+1)-CMA-ES [2]
DASA	**1**	**2.6**	257	437	327	2598	*47e-3/8e5*	.	.	**.**	DASA [17]
DEPSO	**1**	**1.2**	**2.2**	**2.8**	6.4	*11e-2/2e3*	.	.	.	**.**	DEPSO [11]
EDA-PSO	**1**	**1**	**1.9**	**2.5**	**2.4**	**2.9**	3.1	**4.1**	*19e-5/1e5*	**.**	EDA-PSO [5]
full NEWUOA	**1**	3.1	140	74	85	*25e-2/7e3*	.	.	.	**.**	full NEWUOA [22]
GLOBAL	**1**	**1.1**	**1.6**	**2.3**	4.9	3.9	*13e-2/1e3*	.	.	**.**	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**2.2**	56	21	7.2	11	16	10	**1**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	180	32	9.4	**2.2**	**3.0**	*61e-4/1e4*	.	**.**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.2**	**2.4**	**1.3**	**1**	**1**	**1**	*57e-5/2e4*	.	**.**	MA-LS-Chain [18]
MCS	**1**	**1**	6.6	4.3	6.5	15	*38e-3/2e4*	.	.	**.**	MCS [15]
(1+1)-ES	**1**	**1.4**	34	18	13	43	445	*25e-4/1e6*	.	**.**	(1+1)-ES [1]
PSO	**1**	**1.1**	**1.9**	**1**	21	7.2	5.7	**4.0**	**3.3**	***58e-5/1e5***	PSO [6]
PSO_Bounds	**1**	**1.3**	**2.3**	268	43	9.4	8.9	6.0	**3.3**	***12e-4/1e5***	PSO_Bounds [7]
Monte Carlo	**1**	**1.1**	**1.7**	**2.0**	7.1	70	*44e-4/1e6*	.	.	**.**	Monte Carlo [3]
SNOBFIT	**1**	**1.3**	**1.9**	6.5	4.2	*12e-2/2e3*	.	.	.	**.**	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1**	127	17	7.7	12	30	71	***16e-6/9e6***	VNS (Garcia) [10]

Table 51: Running time excess ERT/ERT$_{\text{best}}$ on f_{121} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

121 Sum of different powers Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.33	0.33	0.73	14	45	98	287	500	766	1107	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.2**	**1.9**	3.4	11	93	1210	22990	*27e-5/2e6*	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.3**	**2.2**	**1.3**	6.8	22	12	36	**54**	**142**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.3**	**2.5**	4.3	21	12	**7.1**	28	*31e-5/2e3*	.	BayEDAcG [9]
BFGS	**1**	**1**	60	21	26	51	82	95	*12e-3/3e3*	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1.9**	**1.8**	**1.8**	6.1	40	237	*44e-4/1e4*	.	.	(1+1)-CMA-ES [2]
DASA	**1**	15	273	220	1651	36446	*25e-3/9e5*	.	.	.	DASA [17]
DEPSO	**1**	**1**	**2.3**	**2.3**	4.3	5.1	18	58	*12e-4/2e3*	.	DEPSO [11]
EDA-PSO	**1**	**1.3**	**2.2**	**1.8**	13	539	*51e-4/1e5*	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**2.2**	4.2	**2.2**	**2.9**	5.8	72	*18e-4/6e3*	.	.	full NEWUOA [22]
GLOBAL	**1**	**1.1**	**1.4**	3.7	4.7	24	*12e-3/800*	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.1**	3.1	19	6.5	17	20	78	79	216	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.1**	4.8	**1.1**	**1**	**1**	**1.2**	**1.3**	**1.1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.1**	**1.7**	**2.1**	3.3	**4.9**	8.4	**18**	67	*43e-6/2e4*	MA-LS-Chain [18]
MCS	**1**	**1**	**2.1**	**1.4**	39	2420	*22e-3/2e4*	.	.	.	MCS [15]
(1+1)-ES	**1**	**1.1**	5.0	**1.4**	6.8	39	518	*24e-5/1e6*	.	.	(1+1)-ES [1]
PSO	**1**	**1.1**	**2.8**	**1.6**	12	662	5155	*20e-4/1e5*	.	.	PSO [6]
PSO_Bounds	**1**	**1.2**	**2.4**	**2.1**	179	1898	*16e-3/1e5*	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1.2**	**2.4**	3.7	86	1862	49708	*31e-4/1e6*	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.2**	**2.3**	**1**	7.2	28	40	*10e-3/2e3*	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1**	**2.7**	**1.9**	**1.5**	**1**	**1**	**1**	**1.1**	VNS (Garcia) [10]

Table 52: Running time excess ERT/$\mathrm{ERT_{best}}$ on f_{122} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

122 Schaffer F7 Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
$\mathrm{ERT_{best}}$/D	0.33	0.33	1.9	119	1461	3255	6354	9031	9818	22240	$\mathrm{ERT_{best}}$/D
ALPS-GA	**1**	**1.2**	**1.0**	3.0	**1.5**	**1.5**	**1.3**	**1.3**	**2.0**	3.5	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.2**	**2.0**	**2.2**	**2.1**	**1.4**	**1.1**	**1.0**	**1**	**1.1**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.4**	**1.4**	**2.1**	**1.3**	*67e-3/2e3*	.	.	.	.	BayEDAcG [9]
BFGS	**1**	44	43	*21e-1/3e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	18	10	14	*11e-2/1e4*	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	48	64	394	4179	*21e-2/8e5*	.	.	.	.	DASA [17]
DEPSO	**1**	**1.6**	3.7	**2.0**	**1**	3.0	*23e-3/2e3*	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1.2**	**1.9**	3.1	**2.2**	**2.0**	**2.8**	3.3	4.4	3.0	EDA-PSO [5]
full NEWUOA	**1**	**2.1**	14	12	*32e-2/7e3*	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1.1**	**3.0**	3.1	10	*52e-2/1e3*	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.5**	**1.6**	5.1	4.7	4.5	**2.7**	**2.8**	**2.9**	**2.0**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.4**	57	3.2	**1.5**	**1**	**1**	**1.0**	**1.0**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.5**	**1.5**	**1.6**	**1.1**	**1.3**	**1.1**	**1**	**1.6**	*15e-7/2e4*	MA-LS-Chain [18]
MCS	**1**	**1**	**1.0**	**1.7**	35	*16e-2/2e4*	.	.	.	.	MCS [15]
(1+1)-ES	**1**	**1.5**	12	8.4	20	570	2214	*12e-3/1e6*	.	.	(1+1)-ES [1]
PSO	**1**	**1.1**	**1.1**	**1**	11	13	11	11	12	14	PSO [6]
PSO_Bounds	**1**	**1.2**	**2.2**	131	48	30	20	18	19	20	PSO_Bounds [7]
Monte Carlo	**1**	**1.3**	**1**	6.6	423	*79e-3/1e6*	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.2**	**2.2**	**3.0**	**2.3**	7.6	3.9	*27e-2/2e3*	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1.8**	8.9	3.9	4.0	4.6	11	65	727	VNS (Garcia) [10]

Table 53: Running time excess ERT/ERT$_{\text{best}}$ on f_{123} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

123 Schaffer F7 unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.33	0.33	1.6	515	28760	1.47e6	6.64e7	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.2**	**1.2**	**1.2**	**1**	**2.5**	***12e-3/2e6***	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.2**	**2.7**	32	5.2	4.7	***20e-3/1e6***	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.1**	**2.4**	55	*19e-1/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	5.3	27	23	*22e-1/900*	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1.6**	29	8.5	*60e-2/1e4*	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	6.9	296	88	432	*24e-2/8e5*	.	.	.	.	DASA [17]
DEPSO	**1**	**1.3**	**1.3**	5.5	*11e-1/2e3*	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1.1**	**2.5**	**2.2**	**4.2**	*88e-3/1e5*	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	15	143	47	*14e-1/7e3*	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1.1**	**1.1**	**1.2**	**1.2**	*59e-2/1e3*	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.5**	**1**	18	7.5	**1.7**	***19e-3/1e6***	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.7**	15	9.1	*37e-2/1e4*	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.5**	**1.7**	**1.1**	**1.8**	*12e-2/2e4*	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	4.2	3.2	*43e-2/2e4*	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	14	36	6.6	28	*72e-3/1e6*	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1.2**	**2.4**	31	5.5	**1**	***12e-2/1e5***	.	.	.	PSO [6]
PSO_Bounds	**1**	**1.3**	**2.0**	15	5.1	*11e-2/1e5*	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1.1**	**1.3**	**1.9**	**1**	24	*79e-3/1e6*	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1.1**	**1.1**	**1.9**	**1.7**	*77e-2/2e3*	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**2.1**	11	7.8	6.5	**1**	***79e-4/9e6***	.	.	VNS (Garcia) [10]

Table 54: Running time excess ERT/ERT$_{\text{best}}$ on f_{124} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

124 Schaffer F7 Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.33	0.33	1.2	65	351	1139	2364	3098	4301	4961	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.2**	**2.0**	4.7	24	20711	*17e-3/2e6*	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.2**	**2.0**	**1**	3.5	**4.8**	**10**	**29**	**54**	**156**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.4**	**2.8**	**1.4**	**2.5**	**1.9**	*34e-4/2e3*	.	.	.	BayEDAcG [9]
BFGS	**1**	14	94	81	*10e-1/3e3*	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	17	4.1	30	*77e-3/1e4*	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	5.7	328	252	36274	*19e-2/9e5*	.	.	.	.	DASA [17]
DEPSO	**1**	**1.2**	3.8	**2.2**	3.6	*34e-3/2e3*	.	.	.	.	DEPSO [11]
EDA-PSO	**1.1**	**1.2**	**2.0**	**1.4**	198	*47e-3/1e5*	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	3.0	11	**2.6**	15	*92e-3/6e3*	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1.4**	**1.9**	3.6	*30e-2/600*	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.1**	**2.2**	3.8	9.3	11	19	**52**	**107**	**184**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.3**	4.3	3.4	**1**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.5**	**2.4**	**1.5**	**2.4**	58	89	*36e-3/2e4*	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	6.6	150	*15e-2/2e4*	.	.	.	.	MCS [15]
(1+1)-ES	**1**	**1.5**	10	**2.6**	26	1877	*12e-3/1e6*	.	.	.	(1+1)-ES [1]
PSO	**1**	**1.4**	**2.1**	**1.6**	316	*84e-3/1e5*	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1.1**	**2.3**	3.9	643	*26e-2/1e5*	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1.1**	3.3	11	3925	*96e-3/1e6*	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.1**	**2.0**	**1.7**	67	*23e-2/2e3*	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**2.9**	**1.1**	3.6	14	**12**	52	263	888	VNS (Garcia) [10]

Table 55: Running time excess ERT/ERT$_{\text{best}}$ on f_{125} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

125 Griewank-Rosenbrock Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.33	0.33	0.33	0.33	0.33	1473	9973	18700	20569	24632	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1.1**	9.5	520	**1**	**1.2**	**1**	**1**	**1.4**	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.2**	**6.7**	**103**	3.8	**2.4**	**1.3**	**1.2**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1**	10	314	**2.0**	*92e-4/2e3*	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	6.3	174	11984	*85e-3/4e3*	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1.3**	76	773	3.4	4.3	3.7	6.9	*48e-4/1e4*	(1+1)-CMA-ES [2]
DASA	**1**	**1**	14	1900	14079	120	270	320	583	*28e-4/9e5*	DASA [17]
DEPSO	**1**	**1**	**1.6**	11	537	**1.7**	**3.0**	*67e-4/2e3*	.	.	DEPSO [11]
EDA-PSO	**1**	**1**	**1.2**	10	277	**2.3**	3.3	7.5	12	27	EDA-PSO [5]
full NEWUOA	**1**	**1**	**2.1**	11	279	**1.1**	3.0	5.2	*25e-4/7e3*	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.2**	8.3	418	**1.7**	**1.8**	*13e-3/1e3*	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**1.1**	**7.7**	1529	5.9	5.2	4.5	4.1	3.8	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1**	11	511	3.1	15	7.8	7.1	*37e-4/1e4*	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.1**	7.8	236	**1.3**	**1**	**1.0**	**1.6**	**2.9**	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1**	**1.6**	*20e-4/2e4*	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	**2.1**	68	725	3.0	6.5	14	18	125	(1+1)-ES [1]
PSO	**1**	**1**	**1.2**	16	443	8.8	29	35	32	27	PSO [6]
PSO_Bounds	**1**	**1**	**1.1**	9.1	745	8.6	5.2	4.5	6.6	17	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1**	12	705	15	42	759	*31e-5/1e6*	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1.3**	15	348	**2.1**	*17e-3/2e3*	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1.4**	23	**232**	4.5	4.9	4.8	6.7	11	VNS (Garcia) [10]

Table 56: Running time excess ERT/ERT$_{\text{best}}$ on f_{126} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

126 Griewank-Rosenbrock unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.33	0.33	0.33	0.33	0.33	4611	1.28e5	1.50e5	4.88e5	1.82e6	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1.1**	8.0	650	**1.3**	**1**	**2.5**	**1**	**1**	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.3**	8.0	4795	4.1	**1.9**	29	29	*21e-5/1e6*	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.3**	12	5691	6.1	*95e-3/2e3*	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	3.9	67	5165	*10e-2/900*	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1**	156	1509	4.6	*12e-3/1e4*	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	9.3	664	25787	126	*50e-4/8e5*	.	.	.	DASA [17]
DEPSO	**1**	**1**	**1.3**	12	1506	3.3	*23e-3/2e3*	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1**	**1.2**	10	907	4.3	**2.5**	4.7	*15e-4/1e5*	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	16	245	10580	*63e-3/7e3*	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.1**	7.9	**520**	*34e-3/1e3*	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**1**	16	3598	3.1	3.5	11	14	**8.0**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1**	8.9	3200	5.5	**1.2**	**1**	*14e-3/1e4*	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.1**	8.9	**267**	**1**	**1.8**	**1.5**	*25e-4/2e4*	.	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1**	5.0	*10e-3/2e4*	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	**1.3**	68	1369	4.9	5.0	21	31	*55e-5/1e6*	(1+1)-ES [1]
PSO	**1**	**1**	**1.3**	**6.5**	762	5.5	11	10	*43e-4/1e5*	.	PSO [6]
PSO_Bounds	**1**	**1**	**1.1**	12	46490	13	**2.5**	10	**3.1**	*27e-4/1e5*	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1**	**6.5**	648	4.5	6.0	21	30	*28e-5/1e6*	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1.1**	13	1058	**1.6**	*29e-3/2e3*	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1.4**	23	8186	9.4	5.7	12	**10**	**22**	VNS (Garcia) [10]

Table 57: Running time excess ERT/ERT$_{\text{best}}$ on f_{127} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

127 Griewank-Rosenbrock Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.33	0.33	0.33	0.33	0.33	1168	13102	15016	15116	15332	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1**	13	488	8.1	19	94	768	*57e-6/2e6*	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.2**	8.9	**144**	10	4.3	**7.6**	**13**	**26**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.3**	10	226	**1**	**2.3**	**2.0**	*72e-4/2e3*	.	BayEDAcG [9]
BFGS	**1**	**1**	**1**	188	5140	*51e-3/3e3*	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1.5**	11	923	20	*16e-3/1e4*	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	20	874	22808	559	915	798	*62e-4/8e5*	.	DASA [17]
DEPSO	**1**	**1**	**1.5**	11	308	3.5	**2.3**	*11e-3/2e3*	.	.	DEPSO [11]
EDA-PSO	**1**	**1**	**1.5**	9.0	544	29	54	*30e-4/1e5*	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	**1.7**	13	274	**2.4**	**2.0**	*44e-4/6e3*	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.3**	**7.7**	642	14	*44e-3/1e3*	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**1.2**	11	2257	10	11	16	28	60	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1.1**	10	416	**3.0**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.1**	**8.9**	**147**	3.2	8.3	15	*36e-4/2e4*	.	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1**	7.3	*47e-4/2e4*	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	**1.1**	48	1025	12	26	165	463	*19e-5/1e6*	(1+1)-ES [1]
PSO	**1**	**1**	**1.1**	12	1403	36	*46e-4/1e5*	.	.	.	PSO [6]
PSO_Bounds	**1**	**1**	**1.3**	10	22362	58	35	47	*67e-4/1e5*	.	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1.1**	13	593	20	60	455	452	*74e-5/1e6*	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1.3**	**8.9**	898	4.7	*29e-3/2e3*	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1.4**	23	292	20	12	20	**23**	**24**	VNS (Garcia) [10]

Table 58: Running time excess ERT/ERT$_{\text{best}}$ on f_{128} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

128 Gallagher Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.33	0.33	1.8	142	375	449	639	903	905	1447	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1.3**	**1**	**1.1**	**1.5**	**1.8**	**1.7**	**2.1**	**1.8**	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.4**	7.9	21	19	13	10	10	6.1	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.5**	**3.0**	7.1	33	47	*88e-3/2e3*	.	.	BayEDAcG [9]
BFGS	**1**	**1**	56	36	55	*12e-1/3e3*	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1.4**	3.0	**2.3**	3.1	**2.9**	3.5	4.7	3.9	(1+1)-CMA-ES [2]
DASA	**1**	**1**	80	90	103	135	165	274	343	960	DASA [17]
DEPSO	**1**	**1**	**1.7**	3.9	4.0	3.7	**2.7**	**2.0**	**2.1**	**1.4**	DEPSO [11]
EDA-PSO	**1**	**1**	**1.5**	52	43	37	26	19	20	13	EDA-PSO [5]
full NEWUOA	**1**	**1**	10	5.9	4.1	6.1	4.5	4.3	6.2	35	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.4**	**1.1**	**1**	**1**	**1**	**1**	**1**	**1**	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**2.1**	22	23	21	17	12	12	7.6	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**2.8**	8.4	13	11	8.1	6.1	6.1	4.8	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1**	**1.1**	**1.8**	**2.5**	**2.1**	**1.8**	**2.0**	**1.3**	MA-LS-Chain [18]
MCS	**1**	**1**	4.8	**1.4**	**1.3**	3.9	5.5	22	59	*77e-6/2e4*	MCS [15]
(1+1)-ES	**1**	**1**	4.0	5.6	3.7	4.1	3.9	3.0	3.2	5.3	(1+1)-ES [1]
PSO	**1**	**1**	**1.6**	110	76	67	47	34	34	22	PSO [6]
PSO_Bounds	**1**	**1**	**1.4**	110	68	58	41	30	30	20	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**2.1**	**1.0**	**2.5**	18	49	191	1196	*84e-7/1e6*	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1.9**	**2.0**	**1.5**	**2.3**	**2.6**	**2.6**	3.1	8.3	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**2.2**	29	26	22	15	11	11	7.1	VNS (Garcia) [10]

Table 59: Running time excess ERT/ERT$_{\text{best}}$ on f_{129} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

129 Gallagher unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.33	0.33	1.6	121	1131	2617	5300	8261	9454	12845	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1**	**2.4**	**1**	**1.1**	**1**	**1**	**1**	**1**	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.4**	38	18	22	17	15	14	10	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.8**	15	25	*61e-2/2e3*	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	26	9.1	5.4	*88e-2/900*	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**2.9**	16	4.1	7.5	6.2	18	*17e-3/1e4*	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	93	158	91	86	104	320	639	*20e-5/8e5*	DASA [17]
DEPSO	**1**	**1**	**2.1**	3.9	3.3	5.4	*11e-2/2e3*	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1**	**1.5**	**1.8**	17	18	13	13	12	9.3	EDA-PSO [5]
full NEWUOA	**1**	**1**	148	44	16	18	9.0	*50e-2/7e3*	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.1**	**1.6**	**1.2**	**2.5**	*50e-3/1e3*	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**1.7**	56	7.5	5.8	5.7	6.7	6.0	7.1	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**2.8**	25	10	9.4	4.9	5.2	7.1	11	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.7**	**1**	**1.8**	**1.6**	**1.2**	**1.8**	**1.9**	**2.5**	MA-LS-Chain [18]
MCS	**1**	**1**	6.3	3.3	**2.1**	4.1	7.5	29	25	*37e-4/2e4*	MCS [15]
(1+1)-ES	**1**	**1**	7.2	6.2	3.1	3.1	3.7	10	31	199	(1+1)-ES [1]
PSO	**1**	**1**	**1.8**	148	61	51	30	26	23	22	PSO [6]
PSO_Bounds	**1**	**1**	**1.8**	133	60	44	23	19	17	13	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1.7**	**1.6**	**1.1**	**1.7**	5.0	20	146	1091	Monte Carlo [3]
SNOBFIT	**1**	**1**	3.2	**2.7**	**1.1**	**1**	**1.4**	**1.4**	**1.2**	*22e-3/2e3*	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**2.6**	40	11	9.5	6.4	5.0	4.8	**4.5**	VNS (Garcia) [10]

Table 60: Running time excess ERT/ERT$_{\text{best}}$ on f_{130} in **03-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

130 Gallagher Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.33	0.33	1.8	82	172	305	501	2264	3981	4782	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1.1**	**2.4**	**2.5**	**4.1**	**4.3**	3.3	9.0	183	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.4**	92	135	110	69	17	10	11	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.4**	5.7	33	27	17	3.8	7.2	6.2	BayEDAcG [9]
BFGS	**1**	**1**	34	33	63	*53e-2/3e3*	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**2.2**	6.0	7.0	8.8	15	4.4	8.3	30	(1+1)-CMA-ES [2]
DASA	**1**	**1**	41	128	235	743	793	800	1532	*14e-5/9e5*	DASA [17]
DEPSO	**1**	**1**	**1.4**	6.1	5.6	8.0	6.3	**2.8**	**1.7**	*63e-4/2e3*	DEPSO [11]
EDA-PSO	**1**	**1**	**1.7**	**1.4**	5.6	37	98	85	179	*15e-5/1e5*	EDA-PSO [5]
full NEWUOA	**1**	**1**	**2.2**	4.1	6.4	5.6	7.7	**2.5**	7.0	*53e-6/6e3*	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.3**	**1**	**1**	**1**	**1**	**1**	**1.0**	**2.6**	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**1**	54	74	60	47	11	9.0	11	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1.9**	5.0	23	15	9.2	**2.0**	**1.2**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**2.3**	9.3	10	7.1	6.8	**1.7**	**1**	**1.7**	MA-LS-Chain [18]
MCS	**1**	**1**	**2.9**	3.9	7.5	10	19	54	62	*36e-5/2e4*	MCS [15]
(1+1)-ES	**1**	**1**	**2.8**	3.7	**2.8**	**4.9**	**5.2**	5.6	7.0	145	(1+1)-ES [1]
PSO	**1**	**1**	**1.6**	5.8	152	128	115	74	104	298	PSO [6]
PSO_Bounds	**1**	**1**	**1.9**	95	390	293	236	69	165	145	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1.3**	**2.1**	4.4	15	62	86	303	3024	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1.4**	4.6	5.8	12	15	*42e-3/2e3*	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**2.2**	83	102	61	52	11	10	9.5	VNS (Garcia) [10]

Table 61: Running time excess ERT/ERT$_{\text{best}}$ on f_{101} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

101 Sphere moderate Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.20	0.20	2.2	7.4	8.8	10	12	13	14	15	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.3**	12	42	76	119	126	154	178	224	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.3**	5.2	5.6	10	13	14	16	18	21	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.7**	6.2	23	64	89	118	121	123	127	BayEDAcG [9]
BFGS	**1**	91	742	*70e-1/4e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1.3**	**2.9**	**2.0**	**2.6**	3.2	3.3	3.9	4.3	5.4	(1+1)-CMA-ES [2]
DASA	**1**	11	19	15	18	21	23	26	27	32	DASA [17]
DEPSO	**1**	**1.3**	7.5	11	16	21	23	28	31	38	DEPSO [11]
EDA-PSO	**1**	**1.3**	4.1	8.0	101	268	318	403	486	626	EDA-PSO [5]
full NEWUOA	**1**	3.4	3.3	**1.3**	**1.3**	**1.2**	**1**	**1**	**1**	**1**	full NEWUOA [22]
GLOBAL	**1**	**1.3**	11	8.1	7.7	7.4	6.1	6.2	6.2	6.4	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.3**	3.3	3.4	5.1	6.8	7.1	8.5	10	12	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.9**	4.2	**3.0**	4.1	4.9	5.2	5.8	6.4	7.7	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.3**	6.9	7.5	13	15	15	17	20	23	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	70	166	922	*82e-5/1e4*	.	.	MCS [15]
(1+1)-ES	**1**	**2.5**	**2.9**	**1.8**	**2.4**	**3.0**	**3.1**	**3.4**	**3.8**	**4.6**	(1+1)-ES [1]
PSO	**1**	**1.3**	4.2	7.8	17	29	36	46	57	76	PSO [6]
PSO_Bounds	**1**	**1.2**	4.9	13	53	114	142	186	218	328	PSO_Bounds [7]
Monte Carlo	**1**	**1.7**	10	461	1.93e5	*10e-2/1e6*	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.1**	**2.0**	**1.1**	**1**	**1**	**1.1**	**1.3**	**1.5**	**1.8**	SNOBFIT [16]
VNS (Garcia)	**1**	**1.6**	7.4	6.8	7.5	8.2	7.9	8.6	9.1	11	VNS (Garcia) [10]

Table 62: Running time excess ERT/ERT$_{\text{best}}$ on f_{102} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

102 Sphere moderate unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.20	0.20	2.2	7.1	10	13	14	16	17	20	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.2**	6.6	51	73	92	107	131	149	174	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.3**	5.7	6.0	7.6	8.7	10	12	13	15	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.3**	12	23	59	114	124	123	117	133	BayEDAcG [9]
BFGS	**1**	29	893	*59e-1/3e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1.1**	**2.5**	**2.3**	**2.5**	**2.6**	3.1	3.5	3.7	4.2	(1+1)-CMA-ES [2]
DASA	**1**	61	41	23	22	23	26	30	32	38	DASA [17]
DEPSO	**1**	**1.4**	7.8	9.0	13	15	18	22	24	28	DEPSO [11]
EDA-PSO	**1**	**1.5**	4.9	8.3	96	180	269	331	387	473	EDA-PSO [5]
full NEWUOA	**1**	3.8	3.2	**1.4**	**1.2**	**1**	**1**	**1**	**1**	**1**	full NEWUOA [22]
GLOBAL	**1**	**1.5**	8.2	8.9	6.7	5.5	5.3	5.2	5.0	5.1	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.3**	**2.8**	**2.8**	4.2	4.9	6.1	7.0	7.5	8.5	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.1**	3.1	**2.9**	3.2	3.6	4.1	4.8	5.0	5.7	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.3**	6.9	8.2	12	12	13	16	16	17	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	117	501	9706	*58e-4/1e4*	.	.	MCS [15]
(1+1)-ES	**1**	3.9	**2.9**	**2.1**	**2.2**	**2.3**	**2.7**	**3.1**	**3.3**	**3.9**	(1+1)-ES [1]
PSO	**1**	**1.3**	4.0	10	15	23	31	39	45	55	PSO [6]
PSO_Bounds	**1**	**1.6**	4.1	15	47	82	116	147	178	245	PSO_Bounds [7]
Monte Carlo	**1**	**1.1**	4.2	433	1.70e5	*11e-2/1e6*	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.1**	**2.0**	**1.2**	**1**	**1.0**	**1.3**	**1.5**	**1.7**	**2.1**	SNOBFIT [16]
VNS (Garcia)	**1**	**1.6**	7.1	6.6	6.0	6.2	6.6	7.2	7.5	8.1	VNS (Garcia) [10]

Table 63: Running time excess ERT/ERT$_{\text{best}}$ on f_{103} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

103 Sphere moderate Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.20	0.20	2.2	5.5	6.0	6.0	6.3	6.4	7.0	23	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.5**	8.1	61	121	187	240	8296	*31e-6/1e6*	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.8**	5.0	7.0	12	17	22	169	354	406	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.3**	12	60	134	359	361	455	436	143	BayEDAcG [9]
BFGS	**1**	**2.6**	7.5	4.2	3.9	**3.9**	**3.7**	**3.6**	**3.3**	**1**	BFGS [21]
(1+1)-CMA-ES	**1**	**1.2**	**2.4**	**2.5**	4.2	6.9	29	110	362	1126	(1+1)-CMA-ES [2]
DASA	**1**	7.7	16	19	68	426	2673	1.28e5	1.74e6	*59e-6/9e5*	DASA [17]
DEPSO	**1**	**1.5**	12	14	25	40	70	184	408	*33e-7/2e3*	DEPSO [11]
EDA-PSO	**1**	**1.1**	4.2	11	121	466	1085	2.23e5	*38e-5/1e5*	.	EDA-PSO [5]
full NEWUOA	**1**	5.1	**2.8**	**1.6**	**1.8**	**1.8**	**2.6**	**2.6**	**2.4**	**4.8**	full NEWUOA [22]
GLOBAL	**1**	**1.3**	6.4	11	11	12	16	34	38	33	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.3**	**2.7**	4.5	7.5	12	55	138	381	696	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.5**	3.4	3.9	5.9	8.1	10	13	14	5.7	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.5**	6.0	11	19	26	33	44	49	22	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	102	102	129	126	134	232	MCS [15]
(1+1)-ES	**1**	3.0	**3.0**	**2.4**	**3.6**	5.2	27	124	529	3654	(1+1)-ES [1]
PSO	**1**	**1.3**	3.5	8.3	26	101	1421	47429	*33e-5/1e5*	.	PSO [6]
PSO_Bounds	**1**	**1.1**	4.2	18	86	2831	14730	*87e-5/1e5*	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1.1**	6.2	834	2.91e5	*10e-2/1e6*	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.5**	**1.6**	**1.0**	**1**	**1**	**1**	**1**	**1**	**3.5**	SNOBFIT [16]
VNS (Garcia)	**1**	**1.6**	7.5	8.6	11	13	16	19	20	7.9	VNS (Garcia) [10]

Table 64: Running time excess ERT/ERT$_{\text{best}}$ on f_{104} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

104 Rosenbrock moderate Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	3.8	11	35	155	257	315	354	385	408	457	ERT$_{\text{best}}$/D
ALPS-GA	6.3	22	18	18	29	37	40	45	48	71	ALPS-GA [14]
AMaLGaM IDEA	3.3	3.1	**2.1**	3.6	**2.8**	**2.6**	**2.5**	**2.4**	**2.4**	**2.3**	AMaLGaM IDEA [4]
BayEDAcG	6.8	8.8	21	184	*33e-1/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	354	*61e+1/2e3*	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1.7**	**2.2**	**1**	3.7	4.1	4.8	4.4	4.1	3.9	3.5	(1+1)-CMA-ES [2]
DASA	23	27	11	35	46	88	186	866	3163	14780	DASA [17]
DEPSO	7.6	7.9	4.4	10	55	*53e-2/2e3*	.	.	.	.	DEPSO [11]
EDA-PSO	4.2	5.6	32	39	53	72	92	110	128	157	EDA-PSO [5]
full NEWUOA	**1.8**	3.2	**1.1**	**1.8**	**1.7**	**1.4**	**1.4**	**1.3**	**1.3**	**1.2**	full NEWUOA [22]
GLOBAL	6.4	5.3	**2.2**	**2.0**	3.4	3.7	3.3	3.0	**2.9**	**2.6**	GLOBAL [19]
iAMaLGaM IDEA	**2.1**	**2.3**	**1.5**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**2.4**	15	5.4	14	8.7	7.7	7.0	6.4	6.1	5.5	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	5.0	5.6	3.6	7.1	5.1	4.7	4.4	4.2	4.1	3.8	MA-LS-Chain [18]
MCS	**1**	**1**	**1.5**	923	*23e-1/1e4*	.	.	.	.	.	MCS [15]
(1+1)-ES	**2.2**	**2.6**	**1.1**	4.3	12	25	63	232	981	9878	(1+1)-ES [1]
PSO	3.3	5.1	5.7	171	190	1494	*22e-3/1e5*	.	.	.	PSO [6]
PSO_Bounds	3.4	10	17	2600	5447	*15e-1/1e5*	.	.	.	.	PSO_Bounds [7]
Monte Carlo	10	146	9045	*64e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**2.4**	**2.1**	**1.3**	91	*28e-1/1e3*	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	7.3	4.1	**2.0**	7.4	5.6	5.9	11	11	10	9.0	VNS (Garcia) [10]

Table 65: Running time excess ERT/ERT$_{\text{best}}$ on f_{105} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

105 Rosenbrock moderate unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	3.6	12	33	287	1035	3035	3094	3136	3178	3252	ERT$_{\text{best}}$/D
ALPS-GA	12	26	22	7.0	5.1	3.1	4.0	5.3	6.4	12	ALPS-GA [14]
AMaLGaM IDEA	3.7	3.2	**2.4**	11	3.3	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	AMaLGaM IDEA [4]
BayEDAcG	5.3	10	28	*37e-1/2e3*	.	.	.	.	.	.	BayEDAcG [9]
BFGS	372	*82e+1/1e3*	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**2.1**	3.2	**1.5**	4.4	4.1	7.1	23	22	*16e-3/1e4*	.	(1+1)-CMA-ES [2]
DASA	27	36	17	16	12	15	68	162	479	4562	DASA [17]
DEPSO	5.4	6.2	5.3	16	14	*17e-1/2e3*	.	.	.	.	DEPSO [11]
EDA-PSO	3.5	6.1	40	20	13	8.2	12	16	21	*38e-8/1e5*	EDA-PSO [5]
full NEWUOA	**2.0**	4.2	**1.7**	**1.6**	4.5	6.1	21	42	*22e-3/9e3*	.	full NEWUOA [22]
GLOBAL	9.2	4.8	**2.2**	**1**	**1**	*75e-2/200*	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**2.1**	**1.9**	**1.5**	8.0	**2.8**	**1**	**1**	**1**	**1**	**1**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**2.7**	**1.8**	**1.3**	18	5.0	**1.7**	**1.7**	**1.7**	**1.7**	**1.7**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	5.4	5.0	3.9	58	44	22	22	21	21	21	MA-LS-Chain [18]
MCS	**1**	**1**	**1.6**	516	*32e-1/1e4*	.	.	.	.	.	MCS [15]
(1+1)-ES	**2.4**	**1.8**	**1**	**1.7**	**1.3**	**2.8**	11	34	118	4472	(1+1)-ES [1]
PSO	5.8	6.5	6.4	64	629	462	*70e-2/1e5*	.	.	.	PSO [6]
PSO_Bounds	3.1	6.8	15	1398	1355	462	*15e-1/1e5*	.	.	.	PSO_Bounds [7]
Monte Carlo	7.9	156	13649	*69e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**2.3**	4.0	**2.5**	49	14	*32e-1/1e3*	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	7.6	68	27	42	31	16	17	17	17	17	VNS (Garcia) [10]

Table 66: Running time excess ERT/ERT$_{\text{best}}$ on f_{106} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

106 Rosenbrock moderate Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	3.6	14	18	106	210	354	533	556	577	617	ERT$_{\text{best}}$/D
ALPS-GA	10	19	41	20	37	107	413	*28e-5/1e6*	.	.	ALPS-GA [14]
AMaLGaM IDEA	4.0	**2.7**	4.5	8.8	5.3	11	12	22	28	78	AMaLGaM IDEA [4]
BayEDAcG	4.8	8.3	45	269	136	*34e-1/2e3*	.	.	.	.	BayEDAcG [9]
BFGS	13	16	20	54	104	207	*67e-2/5e3*	.	.	.	BFGS [21]
(1+1)-CMA-ES	**2.3**	**2.0**	**2.1**	4.0	8.6	22	85	*54e-4/1e4*	.	.	(1+1)-CMA-ES [2]
DASA	17	19	19	31	48	321	12631	*18e-4/1e6*	.	.	DASA [17]
DEPSO	6.1	5.3	9.5	35	142	*14e-1/2e3*	.	.	.	.	DEPSO [11]
EDA-PSO	3.8	5.6	75	58	6731	*20e-2/1e5*	.	.	.	.	EDA-PSO [5]
full NEWUOA	**2.0**	**1.0**	**1**	**1**	**1**	**1.7**	3.1	7.8	18	31	full NEWUOA [22]
GLOBAL	6.7	4.7	3.9	**1.3**	**1.0**	**1**	**1.4**	**2.7**	13	*11e-4/400*	GLOBAL [19]
iAMaLGaM IDEA	**2.4**	**1.7**	**2.5**	9.1	10	11	13	23	43	138	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	3.1	**1.6**	**2.3**	**3.0**	**2.1**	**1.4**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	4.8	4.3	6.3	3.9	3.7	3.1	**2.8**	**3.1**	**3.5**	**4.5**	MA-LS-Chain [18]
MCS	**1**	**1**	**2.7**	1348	*27e-1/1e4*	.	.	.	.	.	MCS [15]
(1+1)-ES	**2.2**	**1.2**	**1.4**	6.5	17	38	259	2852	*10e-5/1e6*	.	(1+1)-ES [1]
PSO	4.0	4.5	11	363	3097	*79e-2/1e5*	.	.	.	.	PSO [6]
PSO_Bounds	6.1	13	30	1910	3113	*14e-1/1e5*	.	.	.	.	PSO_Bounds [7]
Monte Carlo	8.0	110	13533	*62e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**2.9**	**1.9**	**2.6**	18	19	40	*18e-1/1e3*	.	.	.	SNOBFIT [16]
VNS (Garcia)	8.2	4.0	4.2	11	6.3	7.7	5.2	5.0	**4.9**	**4.6**	VNS (Garcia) [10]

Table 67: Running time excess ERT/ERT$_{\text{best}}$ on f_{107} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

107 Sphere Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.20	0.20	8.0	117	329	539	703	997	1422	1851	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.4**	**2.7**	4.0	3.4	3.2	3.6	3.3	**2.8**	3.1	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.3**	**1.7**	**2.3**	4.9	3.2	**2.9**	3.1	**2.2**	**2.1**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.4**	**2.5**	**2.6**	**1.9**	**2.0**	**2.1**	**2.4**	5.1	*29e-6/2e3*	BayEDAcG [9]
BFGS	**1**	12	148	*61e-1/2e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	21	16	57	*19e-2/1e4*	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	106	595	1183	9946	*29e-2/7e5*	.	.	.	.	DASA [17]
DEPSO	**1**	**1.6**	3.3	**1.2**	**1**	**1**	**1**	**1**	**1**	**1.1**	DEPSO [11]
EDA-PSO	**1**	**1.3**	**1.6**	4.2	5.6	6.9	7.7	7.1	6.2	6.8	EDA-PSO [5]
full NEWUOA	**1**	6.1	85	96	378	*96e-2/8e3*	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1.1**	**2.6**	4.8	*77e-2/700*	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.9**	33	12	7.7	6.7	6.0	5.1	4.3	6.0	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.2**	5.6	3.9	**1.5**	**2.8**	**3.0**	**2.4**	**1.8**	**1.8**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.5**	**1.9**	**1.9**	**1.9**	**1.8**	**1.9**	**1.5**	**1.2**	**1**	MA-LS-Chain [18]
MCS	**1**	**1**	3.9	**1.7**	20	*81e-3/1e4*	.	.	.	.	MCS [15]
(1+1)-ES	**1**	3.3	31	23	178	1740	20072	*50e-4/1e6*	.	.	(1+1)-ES [1]
PSO	**1**	**1.3**	**1.3**	**1**	**1.2**	**1.2**	**1.8**	**2.1**	**1.9**	**2.0**	PSO [6]
PSO_Bounds	**1**	**1.7**	**1**	**2.1**	8.7	17	28	21	16	14	PSO_Bounds [7]
Monte Carlo	**1**	**1.9**	4.5	19	3460	*96e-3/1e6*	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.2**	**1.5**	5.1	10	14	*14e-2/1e3*	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1.6**	**2.7**	3.1	**1.7**	**1.7**	**2.7**	**2.2**	**1.7**	**1.8**	VNS (Garcia) [10]

Table 68: Running time excess ERT/$\mathrm{ERT_{best}}$ on f_{108} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

108 Sphere unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
$\mathrm{ERT_{best}}$/D	0.20	0.20	17	1029	11158	47870	1.92e5	5.03e5	9.50e5	3.42e6	$\mathrm{ERT_{best}}$/D
ALPS-GA	**1**	**1.1**	**1.1**	**1**	**1.2**	**1.3**	**1.1**	**2.9**	**15**	***98e-6/1e6***	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.7**	75	12	4.4	**2.1**	**1**	**1.2**	**2.1**	**2.1**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.5**	18	*34e-1/2e3*	.	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	6.6	56	*84e-1/900*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	33	24	15	*12e-1/1e4*	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	237	256	460	*65e-2/7e5*	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1.1**	**2.3**	9.3	*19e-1/2e3*	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1.1**	4.9	11	11	30	*38e-3/1e5*	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	89	78	*43e-1/9e3*	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1.2**	**1.4**	**3.6**	*16e-1/900*	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.6**	126	16	6.8	3.4	**1.4**	**1**	**1**	**1**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	104	6.7	**2.0**	**1**	*20e-2/1e4*	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.7**	**1.3**	**1.0**	**1**	**1.8**	*29e-3/2e4*	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	15	6.1	13	*54e-2/1e4*	.	.	.	.	MCS [15]
(1+1)-ES	**1**	96	24	30	216	*12e-2/1e6*	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1.4**	417	48	18	30	*54e-2/1e5*	.	.	.	PSO [6]
PSO_Bounds	**1**	**1.1**	414	86	25	30	7.4	*69e-2/1e5*	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1.6**	**1**	4.1	124	*98e-3/1e6*	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.5**	3.5	6.5	**1.3**	*25e-1/1e3*	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1.6**	61	11	11	46	158	*39e-4/7e6*	.	.	VNS (Garcia) [10]

Table 69: Running time excess ERT/ERT$_{\text{best}}$ on f_{109} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

109 Sphere Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.20	0.20	2.2	11	43	81	114	139	175	189	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.7**	5.2	28	42	3272	*43e-4/1e6*	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.3**	3.7	3.4	19	18	36	40	71	167	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.3**	8.6	41	24	22	22	20	17	19	BayEDAcG [9]
BFGS	**1**	18	39	13	**3.4**	**2.3**	**1.7**	**1.4**	**1.1**	**1**	BFGS [21]
(1+1)-CMA-ES	**1**	**2.1**	**2.5**	6.5	25	396	*20e-3/1e4*	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	4.7	315	2843	43104	*15e-2/7e5*	.	.	.	.	DASA [17]
DEPSO	**1**	**1.4**	10	6.7	5.7	23	126	*51e-4/2e3*	.	.	DEPSO [11]
EDA-PSO	**1**	**1.5**	3.1	4.9	550	18385	*30e-3/1e5*	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	5.6	5.6	5.0	6.1	12	21	28	22	20	full NEWUOA [22]
GLOBAL	**1**	**1.3**	8.1	7.0	5.1	49	35	*49e-3/200*	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.4**	**2.6**	**2.3**	16	31	65	110	182	405	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.7**	4.1	**2.3**	**1**	**1**	**1**	**1**	**1**	**1.2**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.5**	5.8	5.9	5.1	11	20	47	72	430	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	12	22	29	121	296	372	344	MCS [15]
(1+1)-ES	**1**	**2.5**	**2.7**	5.4	13	273	14153	*13e-4/1e6*	.	.	(1+1)-ES [1]
PSO	**1**	**1.1**	4.1	130	1407	18290	*46e-3/1e5*	.	.	.	PSO [6]
PSO_Bounds	**1**	**1.4**	3.6	643	2728	17646	*13e-2/1e5*	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1.5**	11	319	22262	*88e-3/1e6*	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.5**	**2.4**	**1**	3.6	15	35	101	*10e-3/1e3*	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1.6**	7.3	4.2	**1.6**	**1.4**	**1.3**	**1.4**	**1.3**	**1.8**	VNS (Garcia) [10]

Table 70: Running time excess ERT/ERT$_{\text{best}}$ on f_{110} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

110 Rosenbrock Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	10	48	328	6725	24004	1.17e5	2.15e5	4.32e5	1.00e6	2.04e6	ERT$_{\text{best}}$/D
ALPS-GA	4.5	6.2	**2.6**	**1**	**1**	**1**	**1**	**1**	**1**	**2.3**	ALPS-GA [14]
AMaLGaM IDEA	**1.5**	**1**	**2.7**	74	83	17	**9.4**	**4.7**	**2.0**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**2.4**	**2.7**	**1.1**	*30e-1/2e3*	.	.	.	.	.	.	BayEDAcG [9]
BFGS	92	*73e+1/1e3*	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	8.0	13	12	22	*52e-1/1e4*	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	555	1035	2109	*92e-1/7e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**2.7**	**2.2**	**1**	**1.0**	*20e-1/2e3*	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1.7**	4.9	6.5	221	*23e-1/1e5*	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	28	37	83	*15e+0/8e3*	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**2.7**	5.0	5.2	*32e+0/400*	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1.1**	5.6	**2.7**	9.1	46	**11**	**9.4**	**5.6**	**2.4**	**1.5**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1.2**	3.9	**1.7**	6.1	*21e-1/1e4*	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1.8**	**2.2**	**1.1**	11	**15**	*15e-1/2e4*	.	.	.	.	MA-LS-Chain [18]
MCS	**2.1**	3.1	4.8	*54e-1/1e4*	.	.	.	.	.	.	MCS [15]
(1+1)-ES	13	16	12	33	*29e-2/1e6*	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**2.5**	**1.4**	30	*17e-1/1e5*	.	.	.	.	.	PSO [6]
PSO_Bounds	**1.7**	4.0	24	60	59	12	*20e-1/1e5*	.	.	.	PSO_Bounds [7]
Monte Carlo	3.1	31	1082	*63e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1.7**	7.2	4.9	**2.1**	*15e+0/1e3*	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	3.4	**1.5**	**2.0**	8.8	**11**	**9.3**	16	14	19	*77e-6/7e6*	VNS (Garcia) [10]

Table 71: Running time excess ERT/$\mathrm{ERT}_{\mathrm{best}}$ on f_{111} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

111 Rosenbrock unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
$\mathrm{ERT}_{\mathrm{best}}$/D	14	214	1916	1.22e5	4.36e6	1.45e7	nan	nan	nan	nan	$\mathrm{ERT}_{\mathrm{best}}$/D
ALPS-GA	**2.9**	**2.5**	**1.1**	**1**	**1**	***34e-2/1e6***	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1.3**	3.0	4.7	4.5	*53e-2/1e6*	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1.8**	4.1	*67e+0/2e3*	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	61	38	*10e+2/600*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	19	20	75	*44e+0/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	1027	682	2525	*21e+0/7e5*	.	.	.	.	.	.	DASA [17]
DEPSO	3.2	**2.9**	16	*31e+0/2e3*	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**3.0**	**2.5**	5.4	*24e-1/1e5*	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	149	103	*16e+1/8e3*	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	3.5	7.8	*12e+1/900*	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1.3**	8.3	5.1	3.7	**1.0**	**1**	***26e-2/1e6***	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	85	13	3.5	*46e-1/1e4*	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1.5**	**1**	**1**	**1.4**	*19e-1/2e4*	.	.	.	.	.	MA-LS-Chain [18]
MCS	7.1	5.0	16	*12e+0/1e4*	.	.	.	.	.	.	MCS [15]
(1+1)-ES	19	28	92	*45e-1/1e6*	.	.	.	.	.	.	(1+1)-ES [1]
PSO	**2.6**	35	27	**3.4**	*31e-1/1e5*	.	.	.	.	.	PSO [6]
PSO_Bounds	**2.5**	73	80	12	*14e+0/1e5*	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**2.3**	14	150	*66e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**2.1**	8.7	*10e+1/1e3*	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	83	21	8.0	3.6	**2.2**	**6.3**	***11e-2/6e6***	.	.	.	VNS (Garcia) [10]

Table 72: Running time excess ERT/ERT$_{\text{best}}$ on f_{112} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

112 Rosenbrock Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	3.6	14	21	372	684	832	900	963	1026	1119	ERT$_{\text{best}}$/D
ALPS-GA	8.5	20	33	17	330	*50e-3/1e6*	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	3.7	**2.6**	3.5	27	185	271	**262**	**326**	**381**	**352**	AMaLGaM IDEA [4]
BayEDAcG	4.6	5.8	46	*35e-1/2e3*	.	.	.	.	.	.	BayEDAcG [9]
BFGS	119	278	917	*92e+0/3e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1.9**	**2.8**	3.2	6.1	101	*29e-2/1e4*	.	.	.	.	(1+1)-CMA-ES [2]
DASA	21	29	79	306	5557	*18e-2/9e5*	.	.	.	.	DASA [17]
DEPSO	6.4	4.3	7.4	36	44	*25e-1/2e3*	.	.	.	.	DEPSO [11]
EDA-PSO	4.9	8.7	62	*18e-1/1e5*	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1.9**	**1.3**	**1**	5.7	18	**153**	*93e-3/9e3*	.	.	.	full NEWUOA [22]
GLOBAL	5.7	5.0	4.1	**1.6**	**7.0**	*16e-1/300*	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**2.2**	**1.8**	**2.3**	83	341	424	432	464	438	571	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**2.4**	**1.6**	**2.0**	**2.3**	**1.7**	**1.5**	**1.5**	**1.5**	**1.4**	**1.4**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	6.0	4.4	5.4	14	114	421	389	*28e-2/2e4*	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	41	*37e-1/1e4*	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**2.4**	**1.9**	**2.4**	4.1	65	2423	*14e-3/1e6*	.	.	.	(1+1)-ES [1]
PSO	3.8	4.1	8.4	1749	2047	*15e-1/1e5*	.	.	.	.	PSO [6]
PSO_Bounds	5.0	8.0	29	1090	*29e-1/1e5*	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	11	114	18965	*71e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**2.3**	**1.4**	**2.7**	*34e-1/1e3*	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	8.5	5.2	4.5	**1**	**1**	**1**	**1**	**1**	**1**	**1**	VNS (Garcia) [10]

Table 73: Running time excess ERT/ERT$_{\text{best}}$ on f_{113} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

113 Step-ellipsoid Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.20	1.9	27	377	1616	4804	4826	4826	4826	4880	ERT$_{\text{best}}$/D
ALPS-GA	**1.3**	**1.2**	5.9	**2.6**	**2.0**	**1.1**	**1.5**	**1.5**	**1.5**	**1.6**	ALPS-GA [14]
AMaLGaM IDEA	**1.3**	**1**	**1.2**	4.6	**2.4**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1.8**	**1.3**	3.4	**2.6**	3.2	6.1	6.1	6.1	6.1	6.0	BayEDAcG [9]
BFGS	14	102	185	*24e+0/2e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1.1**	25	8.6	40	92	*96e-2/1e4*	.	.	.	.	(1+1)-CMA-ES [2]
DASA	6.3	216	535	2685	*11e-1/7e5*	.	.	.	.	.	DASA [17]
DEPSO	**1.3**	3.5	3.1	**1**	**1**	**1.1**	**1.4**	**1.4**	**1.4**	**1.4**	DEPSO [11]
EDA-PSO	**1.3**	**2.8**	4.5	3.4	17	11	15	15	15	15	EDA-PSO [5]
full NEWUOA	**2.3**	28	19	57	*14e-1/8e3*	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1.9**	**1.1**	4.1	10	7.3	*18e-1/900*	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1.9**	**1.8**	**1**	4.7	4.2	**1.6**	**1.8**	**1.8**	**1.8**	**1.8**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**2.5**	74	16	6.7	3.3	**1.2**	**1.3**	**1.3**	**1.3**	**1.3**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1.5**	**2.1**	**2.2**	**1.5**	4.9	3.4	5.3	5.3	5.3	5.3	MA-LS-Chain [18]
MCS	**1**	**2.0**	**1.5**	9.0	92	*48e-2/1e4*	.	.	.	.	MCS [15]
(1+1)-ES	**2.2**	12	13	32	231	1399	*23e-3/1e6*	.	.	.	(1+1)-ES [1]
PSO	**1.5**	**1.8**	472	182	415	*54e-2/1e5*	.	.	.	.	PSO [6]
PSO_Bounds	**1.5**	**1.8**	**2.5**	21	56	33	43	43	43	43	PSO_Bounds [7]
Monte Carlo	**1.3**	**1.3**	8.7	352	*31e-2/1e6*	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1.2**	**2.3**	7.7	18	*30e-1/1e3*	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**2.3**	28	13	13	7.3	15	15	15	15	VNS (Garcia) [10]

Table 74: Running time excess ERT/ERT$_{\text{best}}$ on f_{114} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

114 Step-ellipsoid unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.20	2.3	153	4575	63851	2.25e5	3.12e5	3.12e5	3.12e5	3.36e5	ERT$_{\text{best}}$/D
ALPS-GA	**1.3**	**1**	**1.2**	**1.0**	**1.2**	**2.5**	**3.4**	**3.4**	**3.4**	**4.8**	ALPS-GA [14]
AMaLGaM IDEA	**1.6**	**1.4**	17	4.6	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1.2**	**1.3**	6.9	*73e-1/2e3*	.	.	.	.	.	.	BayEDAcG [9]
BFGS	20	67	*28e+0/800*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1.1**	43	7.2	15	*29e-1/1e4*	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	4.6	429	257	700	*18e-1/7e5*	.	.	.	.	.	DASA [17]
DEPSO	**1.2**	**2.6**	4.7	*42e-1/2e3*	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1.3**	**1.3**	21	18	*73e-2/1e5*	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1.1**	184	60	*82e-1/8e3*	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1.5**	**2.0**	**2.7**	**2.9**	*45e-1/900*	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1.5**	**1.5**	11	9.2	**2.6**	**2.0**	**2.3**	**2.3**	**2.3**	**2.1**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1.3**	131	15	**3.0**	**2.2**	*99e-2/1e4*	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1.3**	**2.1**	**1.3**	**1**	**1.0**	*29e-2/2e4*	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	5.0	**2.2**	4.8	*13e-1/1e4*	.	.	.	.	.	MCS [15]
(1+1)-ES	10	38	13	45	*29e-2/1e6*	.	.	.	.	.	(1+1)-ES [1]
PSO	**1.2**	**1.6**	**1**	17	7.0	*73e-2/1e5*	.	.	.	.	PSO [6]
PSO_Bounds	**1.4**	**1.9**	102	88	22	*47e-1/1e5*	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1.5**	**1.6**	**2.7**	22	230	*44e-2/1e6*	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1.5**	**2.7**	3.5	*56e-1/1e3*	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1.9**	34	9.3	25	88	286	286	286	265	VNS (Garcia) [10]

Table 75: Running time excess ERT/ERT$_{\text{best}}$ on f_{115} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

115 Step-ellipsoid Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.20	2.0	13	97	366	455	510	510	510	594	ERT$_{\text{best}}$/D
ALPS-GA	**1.3**	**2.5**	13	6.8	25	9619	13309	13309	13309	*16e-3/1e6*	ALPS-GA [14]
AMaLGaM IDEA	**1.3**	**1.9**	**1.8**	4.1	**2.9**	**5.6**	**5.0**	**5.0**	**5.0**	**6.5**	AMaLGaM IDEA [4]
BayEDAcG	**1.5**	**1.5**	5.9	21	78	63	*89e-2/2e3*	.	.	.	BayEDAcG [9]
BFGS	32	125	2215	*24e+0/2e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1.3**	**1.4**	4.7	7.4	43	*11e-2/1e4*	.	.	.	.	(1+1)-CMA-ES [2]
DASA	18	45	416	2745	*63e-2/8e5*	.	.	.	.	.	DASA [17]
DEPSO	**1.1**	**2.3**	4.8	5.5	6.5	65	*58e-3/2e3*	.	.	.	DEPSO [11]
EDA-PSO	**1.7**	**1.7**	7.7	19	183	*65e-3/1e5*	.	.	.	.	EDA-PSO [5]
full NEWUOA	**2.9**	**2.0**	**1**	**2.8**	17	*57e-3/8e3*	.	.	.	.	full NEWUOA [22]
GLOBAL	**1.2**	**1.2**	4.4	4.7	*84e-2/300*	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1.1**	**1.3**	**1.6**	4.2	8.7	19	20	20	20	18	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.4**	**1.4**	**1.5**	**1**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1.3**	**1.5**	**3.0**	3.2	30	72	152	152	152	284	MA-LS-Chain [18]
MCS	**1**	**1.4**	**1.4**	43	405	*83e-2/1e4*	.	.	.	.	MCS [15]
(1+1)-ES	**1.9**	**2.1**	**1.7**	11	64	3045	14146	14146	14146	25195	(1+1)-ES [1]
PSO	**1.5**	**1.3**	**2.6**	194	583	*36e-2/1e5*	.	.	.	.	PSO [6]
PSO_Bounds	**1.3**	**1**	5.1	398	1108	*38e-2/1e5*	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1.3**	**1.8**	22	905	*34e-2/1e6*	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1.1**	**1.4**	4.6	17	*11e-1/1e3*	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**2.1**	3.4	**1**	**4.4**	**5.7**	**5.3**	**5.3**	**5.3**	**5.2**	VNS (Garcia) [10]

Table 76: Running time excess ERT/ERT$_{\text{best}}$ on f_{116} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

116 Ellipsoid Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	23	268	1146	2894	4462	5249	5374	5521	6066	6332	ERT$_{\text{best}}$/D
ALPS-GA	3.1	**2.1**	**1.5**	**2.4**	4.5	14	26	57	277	2334	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**3.0**	4.3	12	*37e+0/2e3*	.	.	.	.	.	.	BayEDAcG [9]
BFGS	68	*12e+2/900*	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	8.1	13	37	*18e+0/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	151	215	1339	*12e+0/7e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**2.6**	**1.5**	**1.9**	4.7	3.2	*73e-1/2e3*	.	.	.	.	DEPSO [11]
EDA-PSO	**1.7**	3.4	25	96	147	268	*18e-1/1e5*	.	.	.	EDA-PSO [5]
full NEWUOA	37	45	*10e+1/8e3*	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**2.6**	3.2	4.5	*94e+0/900*	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	15	4.0	4.0	3.2	**2.5**	**2.4**	**2.4**	**2.8**	**2.6**	**2.6**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1.9**	6.3	4.5	**2.5**	**2.7**	**2.3**	**2.3**	**2.2**	**2.1**	**2.0**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1.4**	**1**	**2.6**	5.6	14	69	*37e-2/2e4*	.	.	.	MA-LS-Chain [18]
MCS	**1.8**	**1.3**	16	49	*12e+0/1e4*	.	.	.	.	.	MCS [15]
(1+1)-ES	6.2	11	40	1554	*17e-1/1e6*	.	.	.	.	.	(1+1)-ES [1]
PSO	**2.8**	60	241	*15e+0/1e5*	.	.	.	.	.	.	PSO [6]
PSO_Bounds	**1.2**	60	133	146	*19e+0/1e5*	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	3.8	19	1741	*11e+0/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1.1**	4.7	*83e+0/1e3*	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**2.0**	12	14	22	52	199	256	629	572	914	VNS (Garcia) [10]

Table 77: Running time excess ERT/ERT$_{\text{best}}$ on f_{117} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

117 Ellipsoid unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	34	865	11606	89726	1.48e5	2.54e5	4.10e5	8.19e5	1.56e6	1.42e7	ERT$_{\text{best}}$/D
ALPS-GA	**1.4**	**1**	**1.4**	**1.6**	12	**58**	***13e-2/1e6***	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	5.9	**2.6**	**1**	**1.3**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1.6**	*21e+1/2e3*	.	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	18	*91e+1/600*	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	24	11	13	*77e+0/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	158	189	*39e+0/7e5*	.	.	.	.	.	.	.	DASA [17]
DEPSO	3.7	7.2	*15e+1/2e3*	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1.2**	15	13	*15e+0/1e5*	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	157	45	*28e+1/8e3*	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**2.9**	3.6	*17e+1/800*	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	15	4.5	**2.0**	**1.5**	**1.8**	**1.7**	**2.1**	**1.3**	**1.5**	***14e-6/1e6***	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	62	10	4.0	**1.6**	**1**	*26e+0/1e4*	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**2.0**	**1.2**	**1**	4.0	*27e-1/2e4*	.	.	.	.	.	MA-LS-Chain [18]
MCS	**2.2**	**1.3**	5.7	*36e+0/1e4*	.	.	.	.	.	.	MCS [15]
(1+1)-ES	18	17	61	157	*67e-1/1e6*	.	.	.	.	.	(1+1)-ES [1]
PSO	68	46	26	16	*19e+0/1e5*	.	.	.	.	.	PSO [6]
PSO_Bounds	**2.0**	43	56	16	*39e+0/1e5*	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1.7**	7.7	109	*94e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**2.0**	8.4	*21e+1/1e3*	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	105	14	10	46	678	*60e-2/7e6*	.	.	.	.	VNS (Garcia) [10]

Table 78: Running time excess ERT/$\mathrm{ERT}_{\mathrm{best}}$ on f_{118} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

118 Ellipsoid Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
$\mathrm{ERT}_{\mathrm{best}}$/D	6.6	11	86	243	311	355	400	441	486	583	$\mathrm{ERT}_{\mathrm{best}}$/D
ALPS-GA	8.2	33	13	32	938	41339	*41e-3/1e6*	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**2.7**	**4.5**	**1**	**2.6**	**3.6**	**4.9**	**10**	**16**	**30**	**54**	AMaLGaM IDEA [4]
BayEDAcG	9.4	180	99	*90e+0/2e3*	.	.	.	.	.	.	BayEDAcG [9]
BFGS	168	1744	*31e+1/3e3*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**2.2**	5.5	8.0	22	230	*32e-2/1e4*	.	.	.	.	(1+1)-CMA-ES [2]
DASA	42	267	1337	27100	*27e-1/9e5*	.	.	.	.	.	DASA [17]
DEPSO	8.1	18	17	38	97	*37e-1/2e3*	.	.	.	.	DEPSO [11]
EDA-PSO	4.5	63	112	317	911	3960	*57e-2/1e5*	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	**1.3**	5.9	70	*22e-2/9e3*	.	.	.	.	full NEWUOA [22]
GLOBAL	7.2	6.8	**1.8**	**3.0**	*74e-2/700*	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**2.2**	**3.3**	**2.7**	3.1	7.7	11	22	44	60	130	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	3.1	9.5	3.8	**2.0**	**1.8**	**1.7**	**1.7**	**1.6**	**1.6**	**1.4**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	4.0	11	4.1	14	44	86	130	260	365	637	MA-LS-Chain [18]
MCS	8.0	24	143	*13e+0/1e4*	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**2.9**	13	36	530	*22e-2/1e6*	.	.	.	.	.	(1+1)-ES [1]
PSO	3.4	650	797	2673	*51e-1/1e5*	.	.	.	.	.	PSO [6]
PSO_Bounds	3.9	28	1765	*12e+0/1e5*	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	7.2	487	15113	*10e+0/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**2.6**	23	87	*33e+0/1e3*	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	6.7	8.1	**1.8**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	VNS (Garcia) [10]

Table 79: Running time excess ERT/ERT_{best} on f_{119} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

119 Sum of different powers Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT_{best}/D	0.20	0.20	2.3	137	628	1564	2695	6191	7059	9949	ERT_{best}/D
ALPS-GA	**1**	**1.8**	**2.1**	**1.8**	**1.8**	**1.4**	**1.6**	**2.2**	29	*15e-7/1e6*	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.8**	**1.4**	4.4	3.6	3.1	**2.0**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1.1**	**1.3**	**2.2**	**2.4**	**1.7**	**1.3**	5.5	*68e-4/2e3*	.	.	BayEDAcG [9]
BFGS	**1**	45	218	120	*50e-1/2e3*	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	32	18	15	50	*20e-2/1e4*	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	41	214	717	5346	*31e-2/7e5*	.	.	.	.	DASA [17]
DEPSO	**1**	**1.5**	**1.5**	**1**	**1**	**1.2**	**1.4**	*19e-4/2e3*	.	.	DEPSO [11]
EDA-PSO	**1**	**1.4**	**1.4**	**1.8**	3.1	**2.6**	**2.1**	15	205	*98e-6/1e5*	EDA-PSO [5]
full NEWUOA	**1**	4.6	12	22	94	*31e-2/8e3*	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1.5**	**1**	4.5	*80e-2/900*	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.3**	**1.3**	**2.7**	3.3	5.8	5.2	3.8	**3.8**	**3.6**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	5.4	4.5	10	3.1	**1.8**	**1.9**	**1.5**	**1.7**	**2.8**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.8**	**1.6**	**1.2**	**1.4**	**1**	**1**	**1.1**	4.7	*61e-7/2e4*	MA-LS-Chain [18]
MCS	**1**	**1**	3.5	**2.0**	15	*75e-3/1e4*	.	.	.	.	MCS [15]
(1+1)-ES	**1**	63	15	11	94	1187	*13e-3/1e6*	.	.	.	(1+1)-ES [1]
PSO	**1**	**1.3**	**1.8**	68	43	18	14	36	*14e-5/1e5*	.	PSO [6]
PSO_Bounds	**1**	**1.2**	**1.7**	53	26	13	13	35	97	*19e-5/1e5*	PSO_Bounds [7]
Monte Carlo	**1**	**1.5**	**1.4**	11	2331	*10e-2/1e6*	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.3**	**1.7**	3.9	7.6	*51e-2/1e3*	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1.2**	**2.8**	7.8	**2.7**	3.1	3.6	7.9	129	11677	VNS (Garcia) [10]

Table 80: Running time excess ERT/ERT$_{\text{best}}$ on f_{120} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

120 Sum of different powers unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.20	0.20	3.2	580	10596	1.48e5	9.53e5	4.51e6	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.3**	**1.5**	**1**	**1**	**2.5**	15	***34e-4/1e6***	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.4**	**1.5**	13	5.6	**1.7**	**1**	**1**	***68e-5/1e6***	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.6**	**1.2**	49	*17e-1/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	19	40	*37e-1/900*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	4.6	29	9.4	*45e-2/1e4*	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	40	842	264	*44e-2/7e5*	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1.4**	**2.3**	5.0	*10e-1/2e3*	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1.3**	**1.1**	14	8.2	**3.0**	*68e-3/1e5*	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	30	151	63	*22e-1/9e3*	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1.3**	**1.0**	**1.8**	*90e-2/900*	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.2**	**1.2**	24	12	**2.4**	**2.0**	**3.3**	***13e-4/1e6***	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.2**	48	11	**2.1**	**1**	*30e-2/1e4*	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.1**	**1.0**	**1.2**	**1.8**	**1.2**	*34e-3/2e4*	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	3.7	8.5	14	*48e-2/1e4*	.	.	.	.	MCS [15]
(1+1)-ES	**1.3**	**2.7**	54	21	122	*91e-3/1e6*	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1.8**	**2.0**	119	15	10	**1.6**	***16e-2/1e5***	.	.	PSO [6]
PSO_Bounds	**1**	**1.7**	**1**	88	27	*60e-2/1e5*	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1.8**	**1.1**	**2.3**	193	*11e-2/1e6*	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.5**	**1.2**	3.3	*13e-1/1e3*	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1.2**	**2.0**	11	15	34	*58e-4/7e6*	.	.	.	VNS (Garcia) [10]

Table 81: Running time excess ERT/ERT$_{\text{best}}$ on f_{121} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

121 Sum of different powers Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.20	0.20	1.7	22	59	135	317	525	774	1239	ERT$_{\text{best}}$/D
ALPS-GA	**1.1**	**1.3**	**1**	11	142	10158	*97e-4/1e6*	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.5**	**2.1**	**1.8**	11	20	**26**	**34**	**42**	**99**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.7**	3.0	23	23	**14**	29	*41e-4/2e3*	.	.	BayEDAcG [9]
BFGS	**1**	127	42	71	344	*50e-2/3e3*	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1.6**	10	54	*35e-3/1e4*	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	13	179	3104	1.74e5	*34e-2/7e5*	.	.	.	.	DASA [17]
DEPSO	**1**	**1.1**	4.6	**2.9**	5.5	49	*14e-3/2e3*	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1.7**	**2.2**	10	1902	*98e-3/1e5*	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1.2**	8.0	3.2	10	31	118	*13e-3/8e3*	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1.7**	**1.9**	3.5	11	*10e-2/400*	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.3**	**2.2**	**1.1**	5.2	32	49	107	115	215	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.5**	**2.3**	**1**	**1**	**1.0**	**1.1**	**1.2**	**1.2**	**1.1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.7**	**2.8**	3.7	**4.8**	31	121	*99e-5/2e4*	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	**1.5**	11	163	*88e-3/1e4*	.	.	.	.	MCS [15]
(1+1)-ES	**1**	4.4	3.0	4.5	45	1761	*51e-4/1e6*	.	.	.	(1+1)-ES [1]
PSO	**1**	**1.5**	**1.6**	378	2095	*83e-3/1e5*	.	.	.	.	PSO [6]
PSO_Bounds	**1.1**	**1.5**	**1.8**	702	3476	10669	*27e-2/1e5*	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1.6**	**2.4**	53	18980	*87e-3/1e6*	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.5**	**1.6**	**1.9**	23	*11e-2/1e3*	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1.2**	3.8	**1.9**	**1.2**	**1**	**1**	**1**	**1**	**1**	VNS (Garcia) [10]

Table 82: Running time excess ERT/ERT$_{\text{best}}$ on f_{122} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

122 Schaffer F7 Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.20	0.20	2.0	807	5089	14035	19629	29989	40491	56925	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.1**	**2.0**	**1.2**	**1**	**1.5**	6.1	13	170	*29e-6/1e6*	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.3**	**1.3**	**2.1**	**2.0**	**1.1**	**1.1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.3**	**1.3**	**1**	*30e-2/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	12	87	*36e-1/3e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	21	25	*12e-1/1e4*	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	3.7	407	1369	*10e-1/7e5*	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1.1**	3.4	**1.2**	*57e-2/2e3*	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1**	**1.2**	4.5	12	30	72	*37e-3/1e5*	.	.	EDA-PSO [5]
full NEWUOA	**1**	**2.1**	30	47	*17e-1/8e3*	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1.2**	**1.4**	*18e-1/900*	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1.1**	**1.3**	**1.3**	5.1	5.0	**2.8**	**2.2**	**1.6**	**1.5**	**1.4**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**2.0**	3.5	**1.3**	**1**	**1**	**2.4**	**3.7**	**2.6**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.3**	**1.6**	**1.9**	**1.8**	**2.1**	19	*76e-4/2e4*	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	**2.8**	5.4	*54e-2/1e4*	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	3.1	17	31	*24e-2/1e6*	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1.1**	**1**	21	44	101	*17e-2/1e5*	.	.	.	PSO [6]
PSO_Bounds	**1**	**1.1**	**1.7**	33	20	49	*85e-3/1e5*	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1.1**	**2.0**	43	*46e-2/1e6*	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.1**	**1.9**	5.4	*20e-1/1e3*	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	3.4	7.5	12	37	538	*76e-5/8e6*	.	.	VNS (Garcia) [10]

Table 83: Running time excess ERT/ERT$_{\text{best}}$ on f_{123} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

123 Schaffer F7 unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.20	0.20	2.2	6744	1.42e6	nan	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.1**	**1.1**	**1**	*25e-2/1e6*	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.4**	**1.8**	4.2	**1.7**	***15e-2/1e6***	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.1**	**2.7**	*25e-1/2e3*	.	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1.4**	46	*39e-1/900*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	27	*21e-1/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	60	417	1450	*14e-1/7e5*	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1.3**	**2.5**	4.4	*26e-1/2e3*	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1.2**	**1.7**	16	*74e-2/1e5*	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1.1**	113	8.8	*35e-1/9e3*	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1.1**	**1.4**	*20e-1/800*	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**2.1**	9.0	**1.9**	***18e-2/1e6***	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.1**	6.1	**2.6**	*10e-1/1e4*	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.3**	**1.3**	**1.2**	*64e-2/2e4*	.	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	6.3	10	*16e-1/1e4*	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	**1.2**	22	11	*59e-2/1e6*	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1**	**1.7**	23	**1**	***12e-1/1e5***	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1**	**1.2**	33	*18e-1/1e5*	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1.2**	**1**	7.1	*49e-2/1e6*	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.2**	3.5	*25e-1/1e3*	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	3.1	13	38	***16e-2/8e6***	.	.	.	.	VNS (Garcia) [10]

Table 84: Running time excess ERT/ERT$_{\text{best}}$ on f_{124} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

124 Schaffer F7 Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.20	0.20	1.9	40	812	1795	4096	5279	9067	35389	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.1**	**1.4**	14	8454	*15e-2/1e6*	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.3**	**2.1**	25	**3.8**	**10**	**10**	**16**	**19**	**9.4**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.1**	**1.8**	**8.7**	**1.8**	**3.0**	*13e-3/2e3*	.	.	.	BayEDAcG [9]
BFGS	**1**	**2.2**	73	988	*39e-1/3e3*	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1.1**	4.7	33	*38e-2/1e4*	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	6.5	323	20357	*97e-2/7e5*	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1.1**	**2.0**	10	*27e-2/2e3*	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1.1**	**2.0**	269	*56e-2/1e5*	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1.3**	5.3	45	*47e-2/8e3*	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1.2**	**1.7**	21	*91e-2/800*	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.1**	**1.1**	15	10	18	**17**	**48**	**57**	**19**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.6**	**1.8**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.3**	**1.8**	**5.1**	223	*20e-2/2e4*	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	16	*55e-2/1e4*	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	**1.4**	4.7	35	8836	*12e-2/1e6*	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1.1**	**1.2**	931	1752	*52e-2/1e5*	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1**	**1.6**	1382	*77e-2/1e5*	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1.1**	**1.9**	955	*46e-2/1e6*	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1.1**	18	*88e-2/1e3*	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	3.5	21	7.7	41	69	457	5405	*20e-6/7e6*	VNS (Garcia) [10]

Table 85: Running time excess ERT/ERT$_{\text{best}}$ on f_{125} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

125 Griewank-Rosenbrock Gauss

Δftarget ERT$_{\text{best}}$/D	1e+03 0.20	1e+02 0.20	1e+01 0.20	1e+00 0.20	1e-01 0.20	1e-02 30213	1e-03 6.20e5	1e-04 9.45e5	1e-05 1.10e6	1e-07 1.10e6	Δftarget ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1.3**	35	10112	**2.9**	11	**15**	**13**	***21e-4/1e6***	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.1**	37	6775	**2.6**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.2**	42	**3189**	*65e-3/2e3*	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	37	2366	*46e-2/3e3*	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1**	143	46453	*75e-3/1e4*	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	36	6469	1.21e6	*68e-3/7e5*	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	**1**	35	12466	*98e-3/2e3*	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1**	**1.1**	31	9214	6.4	*11e-3/1e5*	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	3.9	26	5566	4.0	*41e-3/8e3*	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.3**	35	12829	*13e-2/900*	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**1.2**	**24**	6356	4.9	**2.2**	**2.7**	**2.3**	**2.3**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1**	**22**	12215	4.8	*28e-3/1e4*	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.3**	35	**4747**	**1**	*80e-4/2e4*	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1**	**1.4**	*15e-3/1e4*	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	**2.5**	210	32938	147	*13e-3/1e6*	.	.	.	(1+1)-ES [1]
PSO	**1**	**1**	**1.2**	50	69577	23	**2.3**	*29e-3/1e5*	.	.	PSO [6]
PSO_Bounds	**1**	**1**	**1.2**	27	21970	6.5	*14e-3/1e5*	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1.1**	60	1.46e5	*36e-3/1e6*	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1.3**	30	11000	*13e-2/1e3*	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1**	52	26197	22	19	61	110	***87e-5/8e6***	VNS (Garcia) [10]

Table 86: Running time excess ERT/ERT$_{\text{best}}$ on f_{126} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

126 Griewank-Rosenbrock unif

Δftarget ERT$_{\text{best}}$/D	1e+03 0.20	1e+02 0.20	1e+01 0.20	1e+00 0.20	1e-01 0.20	1e-02 1.75e5	1e-03 nan	1e-04 nan	1e-05 nan	1e-07 nan	Δftarget ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1.2**	30	42159	*21e-3/1e6*	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1**	45	**30243**	84	***15e-3/1e6***	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.2**	**29**	*27e-2/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	5.4	458	*49e-2/1e3*	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1**	408	1.65e5	*12e-2/1e4*	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	**2.9**	3253	2.39e6	*70e-3/7e5*	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	**1.1**	51	1.41e5	*21e-2/2e3*	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1**	**1**	34	46929	*35e-3/1e5*	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	**2.6**	1743	*25e-2/9e3*	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**1**	42	62047	*23e-2/800*	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**1**	38	69229	**42**	***16e-3/1e6***	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1**	108	39633	*85e-3/1e4*	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.1**	35	**9399**	**1**	***27e-3/2e4***	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1**	*25e-3/1e4*	.	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	18	432	2.37e5	*27e-3/1e6*	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1**	**1.2**	40	2.10e5	*63e-3/1e5*	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1**	**1.3**	**26**	3.59e5	*84e-3/1e5*	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1.1**	43	1.22e5	**82**	***34e-3/1e6***	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1.3**	90	*19e-2/1e3*	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1**	56	1.17e5	677	***15e-3/8e6***	.	.	.	VNS (Garcia) [10]

Table 87: Running time excess ERT/ERT$_{\text{best}}$ on f_{127} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

127 Griewank-Rosenbrock Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.20	0.20	0.20	0.20	0.20	25716	1.49e5	7.68e5	1.06e6	2.05e6	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1.4**	46	25330	*17e-3/1e6*	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.1**	40	**2694**	**2.2**	**2.4**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.3**	35	**2190**	*41e-3/2e3*	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	7.8	1333	*38e-2/3e3*	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1.3**	51	54666	*92e-3/1e4*	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	61	4369	2.84e6	*86e-3/7e5*	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	**1.3**	36	14699	*96e-3/2e3*	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1**	**1.3**	32	62948	*49e-3/1e5*	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	4.1	25	10666	*59e-3/8e3*	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.1**	37	*24e-2/800*	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**1.3**	**24**	9757	**3.9**	**7.8**	**4.1**	**3.0**	**6.9**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1**	**19**	3749	**1**	**1**	*18e-3/1e4*	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.2**	39	8559	7.0	*32e-3/2e4*	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1**	*25e-3/1e4*	.	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	**1.1**	65	36487	554	*24e-3/1e6*	.	.	.	(1+1)-ES [1]
PSO	**1**	**1**	**1**	40	1.47e5	*75e-3/1e5*	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1**	**1.2**	44	1.34e5	*78e-3/1e5*	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1**	47	1.24e5	545	*33e-3/1e6*	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1.3**	24	22109	*20e-2/1e3*	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1**	52	26781	14	53	**22**	**16**	**8.1**	VNS (Garcia) [10]

Table 88: Running time excess ERT/ERT$_{\text{best}}$ on f_{128} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

128 Gallagher Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.20	0.20	22	850	1562	2100	2489	2984	3443	4232	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1.7**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.2**	46	46	35	30	25	22	18	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.3**	**2.8**	19	*60e-2/2e3*	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	88	*94e-1/2e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	9.1	4.6	6.8	11	17	14	19	*28e-3/1e4*	(1+1)-CMA-ES [2]
DASA	**1**	**1**	232	176	399	2436	4198	*65e-3/7e5*	.	.	DASA [17]
DEPSO	**1**	**1**	**2.8**	4.4	3.9	**2.9**	**2.5**	**2.1**	**1.8**	**1.5**	DEPSO [11]
EDA-PSO	**1**	**1**	**1.4**	33	44	33	28	24	21	17	EDA-PSO [5]
full NEWUOA	**1**	**1**	15	11	36	57	*16e-2/8e3*	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**1**	**1.6**	**2.3**	**1.7**	4.8	*17e-1/900*	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	8.2	34	21	16	15	12	11	8.9	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	6.8	13	7.6	5.7	4.8	4.0	3.5	**2.8**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.1**	**1.3**	**1.3**	**1.5**	**1.6**	**1.5**	**1.4**	**1.3**	MA-LS-Chain [18]
MCS	**1**	**1**	4.6	**2.3**	3.6	9.5	59	*49e-3/1e4*	.	.	MCS [15]
(1+1)-ES	**1**	**1**	7.5	5.8	8.4	10	26	75	135	1034	(1+1)-ES [1]
PSO	**1**	**1**	**1.9**	50	73	55	46	39	34	27	PSO [6]
PSO_Bounds	**1**	**1**	**2.2**	104	129	132	111	93	81	66	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1.8**	4.1	41	714	5954	*10e-3/1e6*	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	**2.4**	3.3	4.7	7.1	6.0	*18e-1/1e3*	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1.0**	13	12	8.7	7.4	6.2	5.5	5.0	VNS (Garcia) [10]

Table 89: Running time excess ERT/ERT$_{\text{best}}$ on f_{129} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

129 Gallagher unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.20	0.20	13	2142	11889	46274	56948	72928	1.02e5	1.16e5	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	3.3	**2.7**	**1.7**	**1**	**1**	**1**	**1**	**1**	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**2.7**	19	12	**4.2**	**4.8**	**4.5**	**3.3**	**4.2**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	27	*62e-1/2e3*	.	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	85	*76e-1/900*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	34	5.7	5.9	*77e-2/1e4*	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	229	143	399	*25e-2/7e5*	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	5.7	14	*24e-1/2e3*	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1**	5.3	36	11	9.0	12	9.2	6.7	12	EDA-PSO [5]
full NEWUOA	**1**	**1**	128	58	*55e-1/9e3*	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.5**	**1.7**	**1**	*21e-1/900*	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	25	25	13	4.3	**4.7**	**4.4**	5.8	**8.6**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	42	9.2	3.8	*18e-1/1e4*	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.5**	**1**	**1.6**	**1.7**	6.5	5.0	**3.6**	*16e-3/2e4*	MA-LS-Chain [18]
MCS	**1**	**1**	10	4.9	**2.8**	*64e-2/1e4*	.	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	29	6.8	9.0	23	*60e-4/1e6*	.	.	.	(1+1)-ES [1]
PSO	**1**	**1**	**1**	132	34	15	*20e-1/1e5*	.	.	.	PSO [6]
PSO_Bounds	**1**	**1**	**2.8**	129	34	*20e-1/1e5*	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**2.8**	**1.3**	5.7	36	259	*13e-3/1e6*	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	5.3	*29e-1/1e3*	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**2.2**	16	8.9	7.0	8.9	16	26	241	VNS (Garcia) [10]

Table 90: Running time excess ERT/ERT$_{\text{best}}$ on f_{130} in **05-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

130 Gallagher Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.20	0.20	11	162	607	1640	6565	6746	6778	6906	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1.4**	7.7	4.5	4.8	19	219	2120	*12e-5/1e6*	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**2.1**	156	139	52	13	13	14	15	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**2.5**	174	47	*19e-1/2e3*	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	34	112	*20e-1/3e3*	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**2.7**	6.8	4.6	6.0	6.8	*71e-4/1e4*	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	147	548	1475	*60e-3/7e5*	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	4.6	12	5.7	**3.1**	**1**	**4.4**	**4.4**	*94e-2/2e3*	DEPSO [11]
EDA-PSO	**1**	**1**	5.0	315	113	128	107	*23e-3/1e5*	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	3.0	7.0	**3.0**	**3.0**	**2.4**	17	*14e-4/8e3*	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**2.5**	**1**	**1**	**1**	**1.1**	*33e-3/500*	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**1.5**	133	55	23	6.4	7.0	7.5	**7.5**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1**	27	11	4.1	**1.0**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**2.4**	27	17	8.2	**2.1**	**2.3**	**2.5**	**2.9**	MA-LS-Chain [18]
MCS	**1**	**1**	4.1	21	29	40	*35e-2/1e4*	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	3.3	**5.8**	**3.1**	6.6	7.0	76	377	*57e-6/1e6*	(1+1)-ES [1]
PSO	**1**	**1**	**1.7**	384	332	255	107	216	*78e-2/1e5*	.	PSO [6]
PSO_Bounds	**1**	**1**	3.1	575	476	*84e-2/1e5*	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1**	3.2	31	110	532	2262	*42e-4/1e6*	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1.5**	**3.8**	5.3	9.1	**2.3**	*39e-2/1e3*	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1.8**	120	106	70	18	18	18	17	VNS (Garcia) [10]

Table 91: Running time excess ERT/ERT$_{\text{best}}$ on f_{101} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

101 Sphere moderate Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.10	0.10	2.6	4.0	18	19	19	20	21	23	ERT$_{\text{best}}$/D
ALPS-GA	**1**	4.5	70	133	50	72	89	108	123	155	ALPS-GA [14]
AMaLGaM IDEA	**1**	6.4	17	30	11	15	19	22	24	28	AMaLGaM IDEA [4]
BayEDAcG	**1**	7.1	53	81	45	86	108	133	134	139	BayEDAcG [9]
BFGS	**1**	842	*36e+0/3e3*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	6.9	**3.0**	4.2	**1.4**	**1.8**	**2.2**	**2.6**	**2.9**	3.5	(1+1)-CMA-ES [2]
DASA	**1**	183	30	34	10	13	14	16	18	21	DASA [17]
DEPSO	**1**	5.8	16	27	11	16	21	26	31	41	DEPSO [11]
EDA-PSO	**1**	6.1	25	378	182	278	363	444	508	640	EDA-PSO [5]
full NEWUOA	**1**	45	4.0	4.1	**1**	**1**	**1**	**1**	**1**	**1**	full NEWUOA [22]
GLOBAL	**1**	**3.9**	13	11	3.0	3.3	3.7	3.9	4.1	5.0	GLOBAL [19]
iAMaLGaM IDEA	**1**	5.7	8.1	13	5.0	6.9	8.3	10	11	14	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	11	5.1	6.5	**2.1**	**2.8**	3.3	3.9	4.3	5.1	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	5.5	11	19	8.3	11	13	15	16	18	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	20	874	*28e-3/4e3*	.	.	.	MCS [15]
(1+1)-ES	**1**	15	**3.1**	**3.7**	**1.2**	**1.5**	**1.8**	**2.2**	**2.4**	**2.9**	(1+1)-ES [1]
PSO	**1**	5.3	8.9	25	12	18	25	31	35	45	PSO [6]
PSO_Bounds	**1**	5.5	13	141	95	152	219	252	285	485	PSO_Bounds [7]
Monte Carlo	**1**	**3.1**	2203	*36e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	10	4.6	**3.9**	**1.0**	**1.1**	**1.3**	**1.4**	**1.6**	**1.9**	SNOBFIT [16]
VNS (Garcia)	**1**	12	12	11	3.3	4.0	4.5	5.3	5.7	6.7	VNS (Garcia) [10]

Table 92: Running time excess ERT/ERT$_{\text{best}}$ on f_{102} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

102 Sphere moderate unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.10	0.10	2.6	4.1	20	21	23	24	27	30	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**3.7**	69	132	46	64	78	91	100	119	ALPS-GA [14]
AMaLGaM IDEA	**1**	6.8	17	30	10	13	15	17	17	20	AMaLGaM IDEA [4]
BayEDAcG	**1**	5.8	51	73	24	37	41	52	61	63	BayEDAcG [9]
BFGS	**1**	644	*34e+0/3e3*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	11	**3.1**	**4.0**	**1.2**	**1.6**	**1.9**	**2.2**	**2.3**	**2.6**	(1+1)-CMA-ES [2]
DASA	**1**	188	31	34	10	13	15	17	18	22	DASA [17]
DEPSO	**1**	5.7	18	26	9.5	14	18	22	24	29	DEPSO [11]
EDA-PSO	**1**	4.8	45	386	177	248	313	374	403	468	EDA-PSO [5]
full NEWUOA	**1**	40	4.3	4.2	**1**	**1**	**1**	**1**	**1**	**1**	full NEWUOA [22]
GLOBAL	**1**	4.9	13	10	**2.9**	3.8	4.3	4.9	7.2	26	GLOBAL [19]
iAMaLGaM IDEA	**1**	**4.4**	7.2	13	4.6	6.1	7.3	8.3	8.9	10	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	9.0	4.1	6.1	**1.9**	**2.3**	**2.7**	3.0	3.2	**3.6**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	5.1	11	21	8.2	11	12	13	13	14	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	412	*13e-2/4e3*	.	.	.	.	MCS [15]
(1+1)-ES	**1**	15	**3.0**	**4.0**	**1.2**	**1.5**	**1.7**	**2.1**	**2.7**	4.5	(1+1)-ES [1]
PSO	**1**	4.7	9.1	1774	372	361	336	324	298	269	PSO [6]
PSO_Bounds	**1**	7.1	13	98	88	140	187	210	223	438	PSO_Bounds [7]
Monte Carlo	**1**	6.2	3096	*33e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	6.3	6.1	7.6	**1.8**	**2.1**	**2.1**	**2.6**	3.6	5.3	SNOBFIT [16]
VNS (Garcia)	**1**	12	12	11	3.1	3.7	4.1	4.5	4.6	5.0	VNS (Garcia) [10]

Table 93: Running time excess ERT/ERT$_{\text{best}}$ on f_{103} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

103 Sphere moderate Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.10	0.10	2.6	4.7	13	14	36	36	36	36	ERT$_{\text{best}}$/D
ALPS-GA	**1**	4.9	67	111	75	96	24687	*10e-4/5e5*	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	4.4	17	27	16	19	30	103	230	381	AMaLGaM IDEA [4]
BayEDAcG	**1**	5.6	44	66	62	80	49	53	58	67	BayEDAcG [9]
BFGS	**1**	233	12	6.5	**2.9**	**2.5**	**1**	**1**	**1**	**1**	BFGS [21]
(1+1)-CMA-ES	**1**	10	**3.4**	3.6	**2.5**	6.0	23	92	711	*18e-6/1e4*	(1+1)-CMA-ES [2]
DASA	**1**	57	21	22	39	1131	2.42e5	*16e-4/6e5*	.	.	DASA [17]
DEPSO	**1**	14	17	21	17	72	151	*25e-4/2e3*	.	.	DEPSO [11]
EDA-PSO	**1**	4.6	37	349	276	1527	*71e-4/1e5*	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	45	3.8	**3.4**	**1.4**	**1.9**	**1.4**	**2.8**	7.5	20	full NEWUOA [22]
GLOBAL	**1**	6.3	25	17	7.1	6.9	**2.7**	**2.7**	**2.7**	**2.7**	GLOBAL [19]
iAMaLGaM IDEA	**1**	4.4	7.5	12	7.4	9.3	7.4	39	198	1017	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	10	4.8	5.6	3.0	3.6	**1.9**	**2.3**	**2.7**	**3.5**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	7.3	10	18	12	15	8.6	11	17	30	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	14	14	13	25	50	174	MCS [15]
(1+1)-ES	**1**	12	**3.4**	3.6	**1.9**	7.8	46	599	7785	4.07e5	(1+1)-ES [1]
PSO	**1**	5.5	9.1	1539	584	2291	18780	*56e-4/1e5*	.	.	PSO [6]
PSO_Bounds	**1**	**3.4**	11	108	1463	46271	*40e-3/1e5*	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	5.3	1641	*36e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**3.8**	3.9	**2.5**	**1**	**1**	**1.4**	**2.7**	5.5	7.7	SNOBFIT [16]
VNS (Garcia)	**1**	12	11	9.4	4.7	5.3	**2.6**	3.1	3.8	5.0	VNS (Garcia) [10]

Table 94: Running time excess ERT/ERT$_{\text{best}}$ on f_{104} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

104 Rosenbrock moderate Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	9.4	30	61	999	1664	1842	1936	2015	2076	2201	ERT$_{\text{best}}$/D
ALPS-GA	25	20	24	14	14	16	21	33	51	111	ALPS-GA [14]
AMaLGaM IDEA	5.1	3.3	4.3	**1.4**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	12	10	35	*97e-1/2e3*	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*12e+3/1e3*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1.1**	**1.7**	**2.1**	5.5	19	80	*46e-2/1e4*	.	.	.	(1+1)-CMA-ES [2]
DASA	8.7	8.2	11	**2.1**	7.2	23	78	182	1898	*28e-6/9e5*	DASA [17]
DEPSO	5.8	4.5	8.2	30	*70e-1/2e3*	.	.	.	.	.	DEPSO [11]
EDA-PSO	37	57	72	18	17	22	28	34	40	*67e-8/1e5*	EDA-PSO [5]
full NEWUOA	**1**	**1.2**	**1.2**	**1.6**	**2.6**	**2.5**	6.4	6.1	11	14	full NEWUOA [22]
GLOBAL	3.5	**1.5**	**1.4**	**1**	**1.4**	**2.8**	*39e-1/300*	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**2.9**	**2.0**	**2.1**	**2.5**	**1.6**	**1.5**	**1.5**	**1.5**	**1.5**	**1.4**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1.6**	**1**	**1**	5.7	3.6	3.3	**3.2**	**3.0**	**3.0**	**2.8**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	3.8	**3.0**	4.3	34	21	20	19	18	18	17	MA-LS-Chain [18]
MCS	**2.0**	28	*61e+0/4e3*	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1.3**	**1.5**	**1.3**	5.2	10	32	66	386	1203	*21e-6/1e6*	(1+1)-ES [1]
PSO	4.0	4.5	7.0	401	429	*59e-1/1e5*	.	.	.	.	PSO [6]
PSO_Bounds	10	20	53	662	398	766	729	705	*63e-1/1e5*	.	PSO_Bounds [7]
Monte Carlo	3411	*26e+1/1e6*	.	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	3.1	4.2	13	7.3	*13e+0/500*	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	4.1	**2.5**	16	54	51	46	45	44	42	40	VNS (Garcia) [10]

Table 95: Running time excess ERT/ERT$_{\text{best}}$ on f_{105} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

105 Rosenbrock moderate unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	9.0	33	95	2149	8734	8976	9145	9263	9384	9594	ERT$_{\text{best}}$/D
ALPS-GA	26	17	16	10	4.2	**5.6**	**10**	**12**	**16**	**35**	ALPS-GA [14]
AMaLGaM IDEA	4.7	**2.6**	**2.3**	**3.9**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	14	8.8	18	*83e-1/2e3*	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*20e+3/1e3*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1.3**	**2.4**	**1.8**	4.5	3.5	16	*55e-2/1e4*	.	.	.	(1+1)-CMA-ES [2]
DASA	11	11	18	**3.1**	**2.1**	14	44	205	1179	*24e-5/8e5*	DASA [17]
DEPSO	6.2	3.5	3.4	*76e-1/2e3*	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	43	54	45	*52e-1/1e5*	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1.3**	**1.2**	4.4	5.2	*32e-2/1e4*	.	.	.	.	full NEWUOA [22]
GLOBAL	3.7	**1.5**	**1.6**	**1**	*70e-1/300*	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	3.1	**1.8**	**1.2**	9.5	**2.4**	**2.4**	**2.4**	**2.3**	**2.3**	**2.3**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1.9**	**1.4**	**1**	32	16	*72e-1/1e4*	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	4.2	3.0	5.2	163	*52e-1/5e4*	.	.	.	.	.	MA-LS-Chain [18]
MCS	**2.4**	25	*70e+0/4e3*	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1.2**	**1**	**1.7**	8.7	8.0	36	138	251	1538	*71e-5/1e6*	(1+1)-ES [1]
PSO	5.2	223	80	303	*65e-1/1e5*	.	.	.	.	.	PSO [6]
PSO_Bounds	9.2	16	98	316	164	*75e-1/1e5*	.	.	.	.	PSO_Bounds [7]
Monte Carlo	2592	*32e+1/1e6*	.	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	4.7	4.6	11	*16e+0/500*	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	3.8	29	18	313	243	526	594	671	1013	4045	VNS (Garcia) [10]

Table 96: Running time excess ERT/ERT$_{\text{best}}$ on f_{106} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

106 Rosenbrock moderate Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	9.0	19	29	342	771	819	850	874	897	937	ERT$_{\text{best}}$/D
ALPS-GA	28	31	47	140	141	1465	*12e-3/5e5*	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	4.9	5.1	8.6	35	45	86	208	341	426	622	AMaLGaM IDEA [4]
BayEDAcG	14	17	104	*11e+0/2e3*	.	.	.	.	.	.	BayEDAcG [9]
BFGS	27	140	*44e+0/4e3*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1.3**	**2.1**	3.5	24	40	171	*51e-2/1e4*	.	.	.	(1+1)-CMA-ES [2]
DASA	8.1	8.8	11	6.6	29	4000	*16e-3/1e6*	.	.	.	DASA [17]
DEPSO	6.3	6.9	17	85	*67e-1/2e3*	.	.	.	.	.	DEPSO [11]
EDA-PSO	52	93	160	*43e-1/1e5*	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	**1**	**1**	8.1	89	*48e-3/1e4*	.	.	.	full NEWUOA [22]
GLOBAL	3.8	**2.2**	**2.6**	**5.4**	*42e-1/300*	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**2.7**	3.0	4.4	21	17	46	90	212	343	813	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1.8**	**1.5**	**2.1**	**2.0**	**1**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	4.3	4.9	8.3	5.7	**4.9**	**6.5**	**8.2**	**11**	**14**	**32**	MA-LS-Chain [18]
MCS	**2.0**	16	*61e+0/4e3*	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1.1**	**1.6**	**2.4**	18	61	372	16556	*57e-4/1e6*	.	.	(1+1)-ES [1]
PSO	3.8	7.2	13	1948	1818	*62e-1/1e5*	.	.	.	.	PSO [6]
PSO_Bounds	10	25	315	*65e-1/1e5*	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	3829	*32e+1/1e6*	.	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	3.4	6.3	14	*70e-1/500*	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	4.1	3.5	4.6	11	**4.8**	**4.6**	**4.5**	**4.4**	**4.3**	**4.2**	VNS (Garcia) [10]

Table 97: Running time excess ERT/ERT$_{\text{best}}$ on f_{107} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

107 Sphere Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.10	0.10	206	895	1735	4086	5636	6588	7088	8281	ERT$_{\text{best}}$/D
ALPS-GA	**1**	5.1	**1.4**	**1.5**	**1.8**	**1.4**	**1.8**	**2.8**	4.1	15	ALPS-GA [14]
AMaLGaM IDEA	**1**	**3.5**	**2.6**	3.2	3.4	**1.8**	**1.6**	**1.4**	**1.6**	**1.6**	AMaLGaM IDEA [4]
BayEDAcG	**1**	4.2	**1.4**	**1**	**1**	3.7	*32e-3/2e3*	.	.	.	BayEDAcG [9]
BFGS	**1**	602	*33e+0/1e3*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	178	106	*11e+0/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	2974	4898	*11e+0/4e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	4.1	**1.3**	3.2	*97e-2/2e3*	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**3.5**	4.2	11	6.8	4.7	5.3	4.7	4.5	4.1	EDA-PSO [5]
full NEWUOA	**1**	127	103	*13e+0/1e4*	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	5.1	35	*17e+0/500*	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	7.0	**1.8**	6.6	9.5	6.7	5.9	5.1	4.8	4.6	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	17	5.5	3.9	3.6	**1.7**	**1.6**	**1.4**	**1.3**	**2.2**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	6.1	**1**	**1.5**	**1.5**	**1**	**1**	**1**	**1**	**1**	MA-LS-Chain [18]
MCS	**1**	**1**	13	*87e-1/4e3*	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	205	110	15861	*19e-1/1e6*	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	4.9	213	66	60	31	33	31	49	178	PSO [6]
PSO_Bounds	**1**	4.4	39	60	124	165	*59e-2/1e5*	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	4.2	17	*30e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	7.9	5.1	*13e+0/500*	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	12	13	6.9	7.9	5.4	8.5	16	32	166	VNS (Garcia) [10]

Table 98: Running time excess ERT/ERT$_{\text{best}}$ on f_{108} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

108 Sphere unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.10	0.10	1093	1.03e5	3.69e5	6.59e5	3.48e6	1.46e7	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**2.6**	**1.1**	14	***12e-1/5e5***	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	5.2	18	**1**	**1**	**1**	**1**	***28e-4/1e6***	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	5.7	*21e+0/2e3*	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	239	*40e+0/800*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	383	28	*13e+0/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	4643	585	*10e+0/4e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	28	27	*18e+0/2e3*	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	4.4	86	14	***99e-1/1e5***	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	3329	131	*29e+0/1e4*	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	3.9	*19e+0/500*	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	5.9	16	**1.9**	**1.3**	**1.8**	**4.2**	**1**	***62e-4/1e6***	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	47	41	*15e+0/1e4*	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	5.5	**1**	**7.2**	***24e-1/5e4***	.	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	24	*18e+0/4e3*	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	269	87	*54e-1/1e6*	.	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**2.7**	174	*17e+0/1e5*	.	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	4.7	109	*11e+0/1e5*	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	6.0	**3.8**	*34e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	5.1	*21e+0/500*	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	12	44	130	***13e-1/5e6***	.	.	.	.	.	VNS (Garcia) [10]

Table 99: Running time excess ERT/ERT$_{\text{best}}$ on f_{109} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

109 Sphere Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.10	0.10	2.8	29	50	82	116	146	179	242	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**2.3**	68	57	1.44e5	*20e-2/5e5*	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	4.9	16	4.1	12	43	53	58	91	159	AMaLGaM IDEA [4]
BayEDAcG	**1**	**2.9**	43	11	11	**17**	21	19	17	*35e-7/2e3*	BayEDAcG [9]
BFGS	**1**	441	272	49	28	17	**12**	**10**	**10**	**7.3**	BFGS [21]
(1+1)-CMA-ES	**1**	13	8.9	53	1406	*30e-2/1e4*	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	149	1570	*26e-1/5e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	6.1	17	7.5	46	*87e-3/2e3*	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	4.1	39	11342	*13e-1/1e5*	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	33	27	24	2917	*34e-2/1e4*	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	7.3	13	6.3	*35e-2/300*	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	5.1	8.3	**2.1**	10	54	126	193	273	447	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	9.0	**4.8**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	5.3	10	4.5	**10**	184	3162	*28e-4/5e4*	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	19	73	200	231	183	322	238	MCS [15]
(1+1)-ES	**1**	12	**5.9**	7.7	1867	*42e-3/1e6*	.	.	.	.	(1+1)-ES [1]
PSO	**1**	5.1	163	4076	*10e-1/1e5*	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	5.0	2591	*31e-1/1e5*	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	5.9	2363	*29e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	4.8	6.5	18	142	*85e-2/500*	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	12	11	**1.6**	**1.5**	**1.4**	**1.3**	**1.3**	**1.3**	**1.3**	VNS (Garcia) [10]

Table 100: Running time excess ERT/ERT$_{\text{best}}$ on f_{110} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

110 Rosenbrock Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	35	158	4774	3.32e6	7.03e6	nan	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	8.2	5.5	3.5	**1**	**1**	***27e-1/5e5***	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1.6**	**1**	**1.5**	***70e-1/1e6***	.	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	4.8	**3.4**	**1**	***11e+0/2e3***	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*19e+3/700*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	218	*69e+1/1e4*	.	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	12781	*79e+1/4e5*	.	.	.	.	.	.	.	.	DASA [17]
DEPSO	**2.8**	5.1	*28e+0/2e3*	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	15	10	19	***87e-1/1e5***	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	1287	*27e+2/1e4*	.	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	*41e+2/400*	.	.	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	3.9	4.8	***61e-1/1e6***	.	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1.1**	6.8	3.1	***95e-1/1e4***	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	3.2	**2.7**	**1.7**	***75e-1/5e4***	.	.	.	.	.	.	MA-LS-Chain [18]
MCS	29	*45e+1/4e3*	.	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	567	*14e+1/1e6*	.	.	.	.	.	.	.	.	(1+1)-ES [1]
PSO	**3.0**	15	144	***14e+0/1e5***	.	.	.	.	.	.	PSO [6]
PSO_Bounds	208	326	88	***27e+0/1e5***	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	1583	*26e+1/1e6*	.	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	12	*43e+1/500*	.	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1.9**	23	9.3	**3.6**	***16e-1/6e6***	.	.	.	.	.	VNS (Garcia) [10]

Table 101: Running time excess ERT/ERT$_{\text{best}}$ on f_{111} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

111 Rosenbrock unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	384	7262	1.33e5	nan	nan	nan	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	**1.8**	**1.0**	***21e+0/5e5***	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	6.0	**1**	**1**	***80e-1/1e6***	.	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1.5**	4.1	***39e+1/2e3***	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*14e+3/500*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	*25e+2/1e4*	.	.	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	*19e+2/4e5*	.	.	.	.	.	.	.	.	.	DASA [17]
DEPSO	24	*21e+2/2e3*	.	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	45	31	***17e+1/1e5***	.	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	*94e+2/1e4*	.	.	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	*56e+2/400*	.	.	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	4.6	**2.9**	**2.2**	***86e-1/1e6***	.	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	13	**2.5**	***11e+1/1e4***	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.5**	***42e+0/5e4***	.	.	.	.	.	.	.	MA-LS-Chain [18]
MCS	33	*20e+2/4e3*	.	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	336	*54e+1/1e6*	.	.	.	.	.	.	.	.	(1+1)-ES [1]
PSO	249	196	***76e+1/1e5***	.	.	.	.	.	.	.	PSO [6]
PSO_Bounds	180	*85e+1/1e5*	.	.	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	59	*30e+1/1e6*	.	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	*28e+2/500*	.	.	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	34	34	***23e+0/6e6***	.	.	.	.	.	.	.	VNS (Garcia) [10]

Table 102: Running time excess ERT/ERT$_{\text{best}}$ on f_{112} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

112 Rosenbrock Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	10	39	88	1365	1615	1739	1824	1891	1946	2044	ERT$_{\text{best}}$/D
ALPS-GA	21	14	30	1236	*17e-1/5e5*	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	4.3	**2.3**	6.6	251	**244**	**243**	**233**	**226**	**220**	**210**	AMaLGaM IDEA [4]
BayEDAcG	12	7.7	23	*85e-1/2e3*	.	.	.	.	.	.	BayEDAcG [9]
BFGS	1086	*24e+2/2e3*	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1.3**	**1.8**	8.1	*48e-1/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	8.7	24	320	*31e-1/6e5*	.	.	.	.	.	.	DASA [17]
DEPSO	5.5	3.2	15	*88e-1/2e3*	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	44	47	304	*93e-1/1e5*	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1.2**	4.6	*32e-1/1e4*	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	3.3	**1.4**	**2.5**	*78e-1/300*	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**2.4**	**1.6**	**2.2**	335	341	319	306	333	325	310	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1.6**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	3.6	**2.3**	**2.9**	**238**	*56e-1/5e4*	.	.	.	.	.	MA-LS-Chain [18]
MCS	**1.6**	14	*66e+0/4e3*	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1.4**	**1.0**	7.4	642	*70e-2/1e6*	.	.	.	.	.	(1+1)-ES [1]
PSO	4.2	205	1356	*10e+0/1e5*	.	.	.	.	.	.	PSO [6]
PSO_Bounds	12	20	16028	*16e+0/1e5*	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	3022	*33e+1/1e6*	.	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**2.9**	3.4	40	*21e+0/500*	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	3.8	**1.7**	**1.2**	**4.2**	**3.7**	**3.6**	**3.4**	**3.3**	**3.3**	**3.2**	VNS (Garcia) [10]

Table 103: Running time excess ERT/ERT$_{\text{best}}$ on f_{113} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

113 Step-ellipsoid Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.10	16	816	8138	12312	15731	17793	17793	17793	17897	ERT$_{\text{best}}$/D
ALPS-GA	**2.6**	3.1	**1.3**	**2.0**	**6.1**	**30**	44	44	44	52	ALPS-GA [14]
AMaLGaM IDEA	**1.7**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1.9**	**2.8**	**1.3**	*40e-1/2e3*	.	.	.	.	.	.	BayEDAcG [9]
BFGS	108	341	*14e+1/1e3*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	5.8	52	177	*32e+0/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	765	530	7869	*25e+0/4e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**1.7**	**2.9**	3.5	*10e+0/2e3*	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	**2.6**	23	32	25	*21e-1/1e5*	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	10	96	*50e+0/1e4*	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1.9**	3.4	*34e+0/600*	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1.8**	**1.0**	**1.7**	**1.6**	**2.9**	**2.8**	**2.5**	**2.5**	**2.5**	**2.5**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	3.2	15	4.0	5.7	*23e-1/1e4*	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1.9**	**1.9**	**1.2**	**2.4**	14	47	**41**	**41**	**41**	**41**	MA-LS-Chain [18]
MCS	**1**	11	73	*23e+0/4e3*	.	.	.	.	.	.	MCS [15]
(1+1)-ES	22	35	649	*87e-1/1e6*	.	.	.	.	.	.	(1+1)-ES [1]
PSO	**1.8**	**2.7**	84	175	*70e-1/1e5*	.	.	.	.	.	PSO [6]
PSO_Bounds	**1.8**	**2.0**	798	*23e+0/1e5*	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**2.5**	3.3	2296	*10e+0/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**2.2**	4.0	*29e+0/500*	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1.4**	**2.2**	7.8	22	304	4908	4339	4339	4339	4314	VNS (Garcia) [10]

Table 104: Running time excess ERT/ERT_{best} on f_{114} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

114 Step-ellipsoid unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT_{best}/D	0.10	31	20744	1.34e5	9.63e5	4.75e6	4.75e6	4.75e6	4.75e6	7.11e6	ERT_{best}/D
ALPS-GA	**2.7**	**2.3**	**1.7**	***47e-1/5e5***	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**2.6**	**2.2**	**1**	**1**	**1.0**	**1**	**1**	**1**	**1**	**1.0**	AMaLGaM IDEA [4]
BayEDAcG	**1.7**	18	*66e+0/2e3*	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	49	83	*15e+1/800*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	110	68	*40e+0/1e4*	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	96	371	315	***28e+0/4e5***	.	.	.	.	.	.	DASA [17]
DEPSO	**2.3**	38	*79e+0/2e3*	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	**2.0**	818	32	***55e+0/1e5***	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	180	139	*77e+0/1e4*	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**2.3**	**2.3**	*68e+0/400*	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1.8**	31	**2.2**	**1.9**	**1**	**1.5**	**1.5**	**1.5**	**1.5**	**1**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**2.1**	125	*39e+0/1e4*	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**2.7**	**1.4**	**1.8**	***67e-1/5e4***	.	.	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	20	*39e+0/4e3*	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	106	61	357	***16e+0/1e6***	.	.	.	.	.	.	(1+1)-ES [1]
PSO	**1.7**	511	*70e+0/1e5*	.	.	.	.	.	.	.	PSO [6]
PSO_Bounds	**2.1**	502	*49e+0/1e5*	.	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**2.5**	**1**	91	***11e+0/1e6***	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**2.4**	**2.8**	*51e+0/500*	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1.4**	175	34	***42e-1/5e6***	.	.	.	.	.	.	VNS (Garcia) [10]

Table 105: Running time excess ERT/ERT$_{\text{best}}$ on f_{115} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

115 Step-ellipsoid Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.10	3.8	40	290	859	1232	1260	1260	1260	1281	ERT$_{\text{best}}$/D
ALPS-GA	**2.1**	14	11	492	*61e-2/5e5*	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**2.0**	4.3	**1.8**	**3.9**	**3.6**	**4.3**	**4.3**	**4.3**	**4.3**	**4.2**	AMaLGaM IDEA [4]
BayEDAcG	**1.9**	10	11	*40e-1/2e3*	.	.	.	.	.	.	BayEDAcG [9]
BFGS	151	1391	*11e+1/2e3*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	4.0	7.7	12	*21e-1/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	35	135	8305	*77e-1/5e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**1.9**	6.5	7.0	16	*12e-1/2e3*	.	.	.	.	.	DEPSO [11]
EDA-PSO	**2.0**	5.2	27	4838	*19e-1/1e5*	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	16	**2.0**	3.7	143	*13e-1/1e4*	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**2.4**	6.1	4.0	*56e-1/500*	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1.9**	**2.8**	**1.4**	**1.5**	**4.4**	**13**	**14**	**14**	**14**	**14**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	3.2	**2.0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1.9**	3.8	3.7	42	257	*59e-2/5e4*	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	297	*12e+0/4e3*	.	.	.	.	.	.	MCS [15]
(1+1)-ES	7.3	**1.6**	17	2888	*88e-2/1e6*	.	.	.	.	.	(1+1)-ES [1]
PSO	**1.7**	**2.6**	641	*32e-1/1e5*	.	.	.	.	.	.	PSO [6]
PSO_Bounds	**1.9**	3.0	1422	*64e-1/1e5*	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1.9**	13	65437	*11e+0/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**2.3**	4.8	89	*16e+0/500*	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1.4**	6.5	**1.9**	13	38	56	64	64	64	65	VNS (Garcia) [10]

Table 106: Running time excess ERT/ERT$_{\text{best}}$ on f_{116} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

116 Ellipsoid Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	105	1652	7144	10554	10911	11251	11584	11938	12316	16727	ERT$_{\text{best}}$/D
ALPS-GA	**4.8**	**5.0**	**15**	**160**	***15e-1/5e5***	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	16	18	*68e+1/2e3*	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*10e+3/800*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	128	*86e+1/1e4*	.	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	6226	*10e+2/4e5*	.	.	.	.	.	.	.	.	DASA [17]
DEPSO	13	18	*63e+1/2e3*	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	153	394	196	*46e+1/1e5*	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	1383	*25e+2/1e4*	.	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	*31e+2/500*	.	.	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1.7**	**2.5**	**2.8**	**2.7**	**3.0**	**3.4**	**3.5**	**3.5**	**3.7**	**2.8**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	46	16	*17e+1/1e4*	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	5.2	15	33	*30e+0/5e4*	.	.	.	.	.	.	MA-LS-Chain [18]
MCS	45	*99e+1/4e3*	.	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	332	*28e+1/1e6*	.	.	.	.	.	.	.	.	(1+1)-ES [1]
PSO	529	893	*59e+1/1e5*	.	.	.	.	.	.	.	PSO [6]
PSO_Bounds	243	853	*46e+1/1e5*	.	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	527	*40e+1/1e6*	.	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	9.3	*18e+2/500*	.	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	87	54	1437	*12e+0/5e6*	.	.	.	.	.	.	VNS (Garcia) [10]

Table 107: Running time excess ERT/ERT_{best} on f_{117} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

117 Ellipsoid unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT_{best}/D	2519	42425	1.60e5	2.60e5	6.18e5	1.88e6	6.82e6	nan	nan	nan	ERT_{best}/D
ALPS-GA	**1.1**	**37**	***12e+1/5e5***	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**2.0**	**1**	**1**	**1**	**1**	**1**	**1**	***31e-3/1e6***	.	.	AMaLGaM IDEA [4]
BayEDAcG	*28e+2/2e3*	.	.	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*14e+3/500*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	57	*25e+2/1e4*	.	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	1228	*15e+2/4e5*	.	.	.	.	.	.	.	.	DASA [17]
DEPSO	*39e+2/2e3*	.	.	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	47	*97e+1/1e5*	.	.	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	57	*62e+2/1e4*	.	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	*38e+2/400*	.	.	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	3.6	**2.7**	**1.4**	**2.1**	**1.9**	**1.7**	**1.0**	***33e-3/1e6***	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	19	*15e+2/1e4*	.	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	*36e+1/5e4*	.	.	.	.	.	.	.	.	MA-LS-Chain [18]
MCS	4.9	*20e+2/4e3*	.	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	86	*61e+1/1e6*	.	.	.	.	.	.	.	.	(1+1)-ES [1]
PSO	117	*18e+2/1e5*	.	.	.	.	.	.	.	.	PSO [6]
PSO_Bounds	160	*19e+2/1e5*	.	.	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	11	*35e+1/1e6*	.	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	*33e+2/500*	.	.	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	25	383	***16e+1/5e6***	.	.	.	.	.	.	.	VNS (Garcia) [10]

Table 108: Running time excess ERT/ERT$_{\text{best}}$ on f_{118} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

118 Ellipsoid Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	11	31	135	324	434	530	610	651	707	806	ERT$_{\text{best}}$/D
ALPS-GA	34	40	258	21752	*30e-1/5e5*	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	4.8	**3.6**	**1.3**	**2.9**	**4.4**	**10**	**12**	**12**	**20**	**34**	AMaLGaM IDEA [4]
BayEDAcG	98	*59e+1/2e3*	.	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*71e+2/2e3*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**2.7**	18	347	*13e+0/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	110	4865	*58e+0/7e5*	.	.	.	.	.	.	.	DASA [17]
DEPSO	14	61	*72e+0/2e3*	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	52	72	*29e+0/1e5*	.	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	14	433	*48e-1/1e4*	.	.	.	.	.	full NEWUOA [22]
GLOBAL	3.8	5.3	50	*16e+0/1e3*	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**3.7**	**2.8**	**1**	**2.2**	5.1	18	30	54	59	143	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	5.6	7.8	3.4	**2.1**	**1.8**	**1.7**	**1.5**	**1.5**	**1.5**	**1.4**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	6.7	12	16	133	779	*64e-2/5e4*	.	.	.	.	MA-LS-Chain [18]
MCS	137	*65e+1/4e3*	.	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	4.9	148	49955	*16e+0/1e6*	.	.	.	.	.	.	(1+1)-ES [1]
PSO	6.7	2306	10389	*54e+0/1e5*	.	.	.	.	.	.	PSO [6]
PSO_Bounds	18	1686	*63e+0/1e5*	.	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	2198	*34e+1/1e6*	.	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	16	*40e+1/500*	.	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	7.1	4.3	**1.7**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	VNS (Garcia) [10]

Table 109: Running time excess ERT/ERT$_{\text{best}}$ on f_{119} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

119 Sum of different powers Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.10	0.10	18	801	2031	7983	14386	23327	35004	44904	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**2.9**	**2.5**	**1.6**	**2.0**	**1.6**	11	***43e-5/5e5***	**.**	**.**	ALPS-GA [14]
AMaLGaM IDEA	**1**	**2.7**	**1.5**	3.3	3.3	**1.2**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**2.5**	4.8	**1**	**1**	*67e-3/2e3*	.	**.**	**.**	**.**	BayEDAcG [9]
BFGS	**1.7**	272	*13e+0/2e3*	.	.	.	.	**.**	**.**	**.**	BFGS [21]
(1+1)-CMA-ES	**1**	66	64	*31e-1/1e4*	.	.	.	**.**	**.**	**.**	(1+1)-CMA-ES [2]
DASA	**1**	747	787	*33e-1/4e5*	.	.	.	**.**	**.**	**.**	DASA [17]
DEPSO	**1.1**	**2.5**	4.3	**2.6**	*80e-2/2e3*	.	.	**.**	**.**	**.**	DEPSO [11]
EDA-PSO	**1**	**2.7**	3.3	32	27	12	46	***64e-4/1e5***	**.**	**.**	EDA-PSO [5]
full NEWUOA	**1**	122	116	*55e-1/1e4*	.	.	.	**.**	**.**	**.**	full NEWUOA [22]
GLOBAL	**1**	3.4	6.4	*54e-1/600*	.	.	.	**.**	**.**	**.**	GLOBAL [19]
iAMaLGaM IDEA	**1**	3.1	**1.0**	4.0	9.4	3.4	**3.2**	**2.7**	**2.0**	**2.0**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	7.1	25	4.3	3.2	**1**	5.0	***54e-4/1e4***	**.**	**.**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	4.0	**1.3**	**1.2**	**2.2**	**1.3**	**2.3**	***49e-5/5e4***	**.**	**.**	MA-LS-Chain [18]
MCS	**1**	**1**	13	*56e-1/4e3*	.	.	.	**.**	**.**	**.**	MCS [15]
(1+1)-ES	**1.5**	170	32	18099	*13e-1/1e6*	.	.	**.**	**.**	**.**	(1+1)-ES [1]
PSO	**1**	3.3	**1**	91	81	53	*38e-2/1e5*	**.**	**.**	**.**	PSO [6]
PSO_Bounds	**1.1**	3.1	409	347	696	*28e-1/1e5*	.	**.**	**.**	**.**	PSO_Bounds [7]
Monte Carlo	**1**	3.1	5.5	18373	*14e-1/1e6*	.	.	**.**	**.**	**.**	Monte Carlo [3]
SNOBFIT	**1**	4.3	5.5	*52e-1/500*	.	.	.	**.**	**.**	**.**	SNOBFIT [16]
VNS (Garcia)	**1**	3.0	**1.9**	7.0	10	25	729	***10e-4/7e6***	**.**	**.**	VNS (Garcia) [10]

Table 110: Running time excess ERT/ERT$_{\text{best}}$ on f_{120} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

120 Sum of different powers unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.10	0.10	47	65279	2.89e5	2.04e6	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**2.8**	**1.7**	**2.9**	***62e-2/5e5***	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.9**	6.4	**1**	**1**	**1**	***32e-3/1e6***	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	**2.8**	13	*77e-1/2e3*	.	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	105	263	*15e+0/800*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	221	64	*63e-1/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	43	462	*46e-1/4e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**2.5**	21	*63e-1/2e3*	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**2.8**	328	10	***47e-1/1e5***	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	440	308	*99e-1/1e4*	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**2.3**	**2.3**	*79e-1/500*	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**2.8**	15	**1.8**	**2.5**	**2.2**	***47e-3/1e6***	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	2076	98	*52e-1/1e4*	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	5.1	**1**	**1.1**	***10e-1/5e4***	.	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	59	*81e-1/4e3*	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	217	46	224	***23e-1/1e6***	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	3.2	332	21	***48e-1/1e5***	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**2.6**	774	*61e-1/1e5*	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**2.7**	**2.0**	*15e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	3.1	4.1	*69e-1/500*	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	3.0	97	24	***63e-2/6e6***	.	.	.	.	.	VNS (Garcia) [10]

Table 111: Running time excess ERT/ERT$_{\text{best}}$ on f_{121} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

121 Sum of different powers Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.10	0.10	7.2	32	63	148	368	694	999	1821	ERT$_{\text{best}}$/D
ALPS-GA	**1.1**	3.3	10	81	*25e-2/5e5*	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**2.1**	3.2	11	30	**44**	**32**	**39**	**46**	**43**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.7**	8.6	22	30	64	*41e-3/2e3*	.	.	.	BayEDAcG [9]
BFGS	**1**	400	569	*10e+0/2e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	4.7	4.0	41	*49e-2/1e4*	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	45	578	*26e-1/5e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**2.2**	4.6	8.8	139	*17e-2/2e3*	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**2.9**	**2.3**	9443	*14e-1/1e5*	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	32	10	144	*55e-2/1e4*	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1.9**	3.8	18	*11e-1/300*	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**2.9**	**1.6**	**3.4**	**21**	72	94	87	127	123	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	4.1	**1**	**1**	**1**	**1**	**1.2**	**1.1**	**1.1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**2.7**	**2.5**	4.8	43	*28e-3/5e4*	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	7.1	*22e-1/4e3*	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	11	3.3	54	28154	*10e-2/1e6*	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**2.9**	**1.7**	7448	*13e-1/1e5*	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**2.9**	4.9	*20e-1/1e5*	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	3.0	10	*15e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	3.5	4.4	*26e-1/500*	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	3.0	3.5	**1.6**	**1.4**	**1.1**	**1**	**1**	**1**	**1.0**	VNS (Garcia) [10]

Table 112: Running time excess ERT/ERT$_{\text{best}}$ on f_{122} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

122 Schaffer F7 Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.10	0.10	5.5	2783	33354	60837	71048	73825	1.01e5	4.45e5	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.3**	**1.9**	7.1	**69**	***12e-2/5e5***	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.3**	**1.7**	**1.8**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.2**	**1.4**	**1**	*85e-2/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	11	143	*82e-1/2e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1.5**	24	*40e-1/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	346	*38e-1/4e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1.1**	3.8	*27e-1/2e3*	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1.1**	3.4	84	*16e-1/1e5*	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	10	65	*49e-1/1e4*	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1.1**	**2.4**	*50e-1/600*	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.1**	**1**	**4.4**	**2.7**	**1.8**	**1.7**	**1.8**	**1.5**	**1.3**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.1**	39	7.4	*14e-1/1e4*	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.3**	**1.2**	6.9	*56e-2/5e4*	.	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	3.3	*37e-1/4e3*	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	20	*19e-1/1e6*	.	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1.1**	**1.7**	252	*25e-1/1e5*	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1**	4.1	240	*24e-1/1e5*	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1.2**	**2.8**	*20e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	4.2	*49e-1/500*	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	3.7	63	2926	***24e-2/7e6***	.	.	.	.	VNS (Garcia) [10]

Table 113: Running time excess ERT/ERT$_{\text{best}}$ on f_{123} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

123 Schaffer F7 unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.10	0.10	4.0	3.20e5	nan	nan	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.1**	**2.4**	***15e-1/5e5***	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.9**	3.0	**1**	***68e-2/1e6***	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.1**	9.3	***57e-1/2e3***	.	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	11	146	***87e-1/900***	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1.2**	137	***48e-1/1e4***	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**2.7**	292	***37e-1/4e5***	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1.2**	64	***50e-1/2e3***	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1.3**	3.7	***48e-1/1e5***	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	91	350	***60e-1/1e4***	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	5.0	***53e-1/400***	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.3**	5.9	**2.3**	***85e-2/1e6***	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.6**	163	***44e-1/1e4***	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.3**	**1**	***19e-1/5e4***	.	.	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	37	***47e-1/4e3***	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	17	76	***25e-1/1e6***	.	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1.3**	**2.8**	***43e-1/1e5***	.	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1.1**	6.1	***56e-1/1e5***	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1.1**	3.1	***20e-1/1e6***	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.1**	5.4	***53e-1/500***	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	354	***15e-1/6e6***	.	.	.	.	.	.	VNS (Garcia) [10]

Table 114: Running time excess ERT/ERT$_{\text{best}}$ on f_{124} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

124 Schaffer F7 Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.10	0.10	3.7	91	2413	5029	7836	16576	72243	2.45e5	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.2**	**2.8**	4836	*99e-2/5e5*	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.3**	**2.5**	**4.5**	**2.1**	**3.2**	**5.1**	**4.5**	**1.5**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.3**	**2.8**	7.0	**1.2**	**5.9**	*74e-3/2e3*	.	.	.	BayEDAcG [9]
BFGS	**1**	6.9	465	*89e-1/2e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	3.3	9.0	1600	*19e-1/1e4*	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	212	*31e-1/5e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1.4**	3.6	33	*97e-2/2e3*	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1.1**	**1.2**	**2.3**	*31e-1/1e5*	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	9.2	*23e-1/1e4*	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1.3**	3.2	*33e-1/500*	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.1**	**1.5**	8.3	6.8	12	**18**	**12**	**3.3**	**1.2**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.3**	**1.8**	**3.7**	**1**	**1**	**1**	**1**	**1**	***86e-6/1e4***	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.3**	**1.7**	85	*62e-2/5e4*	.	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	*25e-1/4e3*	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	10	6.8	8021	*93e-2/1e6*	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1.4**	**1.3**	*27e-1/1e5*	.	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1**	**2.4**	*34e-1/1e5*	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1.3**	**2.5**	*22e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.5**	**2.0**	*28e-1/500*	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	4.1	**1**	3.7	31	353	*64e-5/6e6*	.	.	VNS (Garcia) [10]

Table 115: Running time excess ERT/ERT$_{\text{best}}$ on f_{125} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

125 Griewank-Rosenbrock Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.10	0.10	0.10	0.10	0.10	1.41e7	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1.1**	490	3.40e7	***12e-2/5e5***	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.1**	158	1.08e6	***42e-3/1e6***	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.1**	220	*24e-2/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	**1.7**	40983	*97e-2/3e3*	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1**	2996	*40e-2/1e4*	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	**2.9**	89369	*40e-2/4e5*	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	**1.1**	288	*41e-2/2e3*	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1**	**1**	312	6.96e6	***12e-2/1e5***	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	10	235	*20e-2/1e4*	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.3**	1179	*69e-2/500*	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**1.2**	**113**	1.93e6	**1**	***37e-3/1e6***	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1**	**89**	**7.34e5**	***22e-2/1e4***	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.1**	167	**8.49e5**	***10e-2/5e4***	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1**	***25e-3/4e3***	.	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	**1**	2981	*25e-2/1e6*	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1**	**1.1**	250	*21e-2/1e5*	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1**	**1.2**	324	1.45e7	***17e-2/1e5***	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1**	1428	*28e-2/1e6*	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1.1**	383	*58e-2/500*	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1.4**	298	2.21e7	***76e-3/8e6***	.	.	.	.	VNS (Garcia) [10]

Table 116: Running time excess ERT/ERT$_{\text{best}}$ on f_{126} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

126 Griewank-Rosenbrock unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.10	0.10	0.10	0.10	0.10	nan	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1**	509	*21e-2/5e5*	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.3**	218	4.87e7	***11e-2/1e6***	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.1**	310	*59e-2/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	6.1	15923	*11e-1/1e3*	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1**	4455	*53e-2/1e4*	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	**1.2**	1.15e5	*47e-2/4e5*	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	**1.1**	1023	*77e-2/2e3*	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1**	**1**	2600	**1.46e7**	***41e-2/1e5***	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	28	70868	*75e-2/1e4*	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.1**	1506	*78e-2/500*	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**1.3**	**196**	**3.26e7**	***13e-2/1e6***	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1.1**	12657	*41e-2/1e4*	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.1**	**189**	*22e-2/5e4*	.	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1**	***25e-3/4e3***	.	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	**1**	6820	*30e-2/1e6*	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1**	**1.3**	955	*34e-2/1e5*	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1**	**1**	1.55e5	*61e-2/1e5*	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1.1**	985	*31e-2/1e6*	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1.2**	666	*73e-2/500*	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1.4**	17694	*16e-2/7e6*	.	.	.	.	.	VNS (Garcia) [10]

Table 117: Running time excess ERT/ERT$_{\text{best}}$ on f_{127} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

127 Griewank-Rosenbrock Cauchy

Δftarget ERT$_{\text{best}}$/D	1e+03 0.10	1e+02 0.10	1e+01 0.10	1e+00 0.10	1e-01 0.10	1e-02 1.47e5	1e-03 3.14e6	1e-04 4.46e6	1e-05 4.46e6	1e-07 4.46e6	Δftarget ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1**	373	*17e-2/5e5*	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1**	153	**1.34e5**	**3.0**	**1.1**	**1.6**	**1.6**	**1.6**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.2**	237	*21e-2/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	60	58490	*11e-1/2e3*	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1**	790	*39e-2/1e4*	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	10	57603	*46e-2/4e5*	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	**1.1**	275	*33e-2/2e3*	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1**	**1.1**	92	*29e-2/1e5*	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	**1**	**69**	*23e-2/1e4*	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.1**	884	*68e-2/500*	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**1**	90	3.98e5	**8.2**	**1**	**1**	**1**	**1**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1**	**47**	**37096**	**1**	***34e-3/1e4***	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.1**	130	*19e-2/5e4*	.	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1**	*25e-3/4e3*	.	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	**2.5**	854	*19e-2/1e6*	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1**	**1.1**	565	*32e-2/1e5*	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1**	**1**	534	*40e-2/1e5*	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1.1**	1175	*33e-2/1e6*	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1**	245	*65e-2/500*	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1.4**	224	3.76e5	50	***96e-4/7e6***	.	.	.	VNS (Garcia) [10]

Table 118: Running time excess ERT/ERT$_{\text{best}}$ on f_{128} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

128 Gallagher Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.10	0.10	2419	13803	14050	14393	29169	29302	38266	52875	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1.4**	**1.7**	**1.9**	**2.0**	**1.1**	**1.2**	**1**	**1**	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.9**	5.1	5.4	5.4	**2.8**	**2.8**	**2.1**	**1.6**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1**	**2.2**	*93e-1/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	*57e+0/2e3*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	9.5	*15e+0/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	150	*91e-1/4e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	**2.0**	**1**	**1**	**1**	**1**	**1**	*15e+0/2e3*	.	DEPSO [11]
EDA-PSO	**1**	**1**	118	101	100	97	48	48	37	27	EDA-PSO [5]
full NEWUOA	**1**	**1**	29	*23e+0/1e4*	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	3.3	*22e+0/500*	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	5.3	6.0	11	11	5.7	5.8	4.4	3.3	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	4.3	3.2	4.9	10	5.0	5.0	3.8	**2.8**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.5**	**2.9**	**3.0**	**3.1**	**1.6**	**1.6**	**1.2**	**1.0**	MA-LS-Chain [18]
MCS	**1**	**1**	5.1	4.1	*13e+0/4e3*	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	14	122	*16e-1/1e6*	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1**	87	*16e+0/1e5*	.	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1**	85	*19e+0/1e5*	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1**	4.1	1063	*20e-1/1e6*	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1.5**	*22e+0/500*	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	12	9.0	9.1	11	7.0	10	13	14	VNS (Garcia) [10]

Table 119: Running time excess ERT/ERT$_{\text{best}}$ on f_{129} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

129 Gallagher unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.10	0.10	7100	7.25e5	2.00e6	3.22e6	3.23e6	3.25e6	4.53e6	1.42e7	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1.6**	4.9	***23e-1/5e5***	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	8.8	**1.2**	**1**	**1**	**1**	**1**	**1**	**1.0**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	*30e+0/2e3*	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	*46e+0/900*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	*18e+0/1e4*	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	272	*13e+0/4e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	4.2	*24e+0/2e3*	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1**	199	*20e+0/1e5*	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	*41e+0/1e4*	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	*28e+0/400*	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	9.2	**3.3**	**3.3**	**4.4**	**4.4**	**4.4**	**3.1**	**1**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	10	*22e+0/1e4*	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.3**	**1**	***48e-1/5e4***	.	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	*21e+0/4e3*	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	16	20	***56e-1/1e6***	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1**	198	*18e+0/1e5*	.	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1**	197	*26e+0/1e5*	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1**	6.0	***20e-1/1e6***	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	*27e+0/500*	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	32	13	***72e-2/7e6***	.	.	.	.	.	VNS (Garcia) [10]

Table 120: Running time excess ERT/ERT$_{\text{best}}$ on f_{130} in **10-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

130 Gallagher Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.10	0.10	48	588	3747	7052	7091	7151	7219	7334	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	6.7	9.0	67	*62e-3/5e5*	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	8.0	166	35	19	19	20	**20**	**20**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	17	23	*20e-1/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	100	*10e+0/2e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**2.5**	6.5	11	*51e-2/1e4*	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	587	*30e-1/5e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	8.3	10	**1.8**	*19e-1/2e3*	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1**	380	684	*53e-1/1e5*	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	6.7	8.3	5.1	*12e-2/1e4*	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.0**	**1**	**1**	*50e-2/600*	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**1**	**4.4**	**1.5**	**1.8**	**8.4**	**11**	**12**	21	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**2.3**	11	**1.9**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	4.7	19	7.1	**3.9**	**5.2**	**15**	*15e-5/5e4*	.	MA-LS-Chain [18]
MCS	**1**	**1**	32	*30e-1/4e3*	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	**1.7**	**4.6**	24	457	*18e-3/1e6*	.	.	.	(1+1)-ES [1]
PSO	**1**	**1**	182	681	193	*25e-1/1e5*	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1**	772	*69e-1/1e5*	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1**	159	24087	*21e-1/1e6*	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	**2.2**	12	*28e-1/500*	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	97	214	38	20	20	20	20	**19**	VNS (Garcia) [10]

Table 121: Running time excess ERT/ERT$_{\text{best}}$ on f_{101} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

101 Sphere moderate Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.05	0.28	3.0	21	29	34	35	36	37	39	ERT$_{\text{best}}$/D
ALPS-GA	**1**	91	101	32	38	45	56	68	79	101	ALPS-GA [14]
AMaLGaM IDEA	**1**	59	57	15	17	18	21	24	26	31	AMaLGaM IDEA [4]
BayEDAcG	**1**	93	109	26	27	30	48	53	58	765	BayEDAcG [9]
BFGS	**1**	20839	*11e+1/3e3*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	15	**4.4**	**1**	**1.0**	**1.1**	**1.3**	**1.5**	**1.7**	**2.1**	(1+1)-CMA-ES [2]
DASA	**1**	63	22	5.1	5.3	6.1	7.8	10	12	16	DASA [17]
DEPSO	**1**	32	23	8.6	14	21	33	50	107	*27e-6/2e3*	DEPSO [11]
EDA-PSO	**1**	19	257	100	120	142	173	207	236	292	EDA-PSO [5]
full NEWUOA	**1**	43	5.8	**1.4**	**1.2**	**1**	**1**	**1**	**1**	**1**	full NEWUOA [22]
GLOBAL	**1**	34	9.1	**3.0**	4.5	6.2	7.3	8.9	19	246	GLOBAL [19]
iAMaLGaM IDEA	**1**	22	23	6.3	7.0	7.7	9.3	11	12	15	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**12**	5.5	**1.4**	**1.4**	**1.5**	**1.8**	**2.1**	**2.4**	**2.9**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	20	17	5.3	5.9	6.5	7.9	8.9	10	11	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	283	*11e-1/4e3*	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	16	**4.9**	**1.0**	**1**	**1.0**	**1.2**	**1.4**	**1.5**	**1.9**	(1+1)-ES [1]
PSO	**1**	15	16	7.3	10	12	15	19	22	28	PSO [6]
PSO_Bounds	**1**	**15**	91	169	184	203	229	257	296	881	PSO_Bounds [7]
Monte Carlo	**1**	117	*29e+0/1e6*	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	21	52	36	27	25	103	102	*37e-1/300*	.	SNOBFIT [16]
VNS (Garcia)	**1**	35	8.5	**1.9**	**1.9**	**2.0**	**2.3**	**2.6**	**2.9**	3.5	VNS (Garcia) [10]

Table 122: Running time excess ERT/ERT$_{\text{best}}$ on f_{102} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

102 Sphere moderate unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.05	0.29	12	20	29	38	46	49	58	70	ERT$_{\text{best}}$/D
ALPS-GA	**1**	61	27	34	38	40	44	51	53	59	ALPS-GA [14]
AMaLGaM IDEA	**1**	46	16	19	19	19	19	20	19	19	AMaLGaM IDEA [4]
BayEDAcG	**1**	52	27	27	27	30	29	36	37	426	BayEDAcG [9]
BFGS	**1**	64123	*12e+1/3e3*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**12**	**1**	**1**	**1**	**1**	**1.0**	**1.1**	**1.1**	**1.6**	(1+1)-CMA-ES [2]
DASA	**1**	72	7.5	7.4	7.9	8.1	9.3	12	17	34	DASA [17]
DEPSO	**1**	35	6.3	8.8	13	19	33	53	171	*46e-6/2e3*	DEPSO [11]
EDA-PSO	**1**	20	68	463	365	314	288	296	275	265	EDA-PSO [5]
full NEWUOA	**1**	42	**1.6**	**1.7**	**1.3**	**1.1**	**1**	**1**	**1**	**1**	full NEWUOA [22]
GLOBAL	**1**	42	**2.9**	5.4	13	51	*24e-3/600*	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	18	5.6	6.4	6.7	6.8	7.0	7.8	7.8	8.2	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**13**	**1.6**	**1.5**	**1.4**	**1.4**	**1.4**	**1.5**	**1.5**	**1.6**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	19	5.1	6.3	6.9	6.8	6.4	6.9	6.5	6.4	MA-LS-Chain [18]
MCS	**1**	**1**	8.3	804	*25e-1/4e3*	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	34	**2.6**	4.0	5.6	14	20	67	294	6651	(1+1)-ES [1]
PSO	**1**	19	4.5	369	258	201	168	160	138	118	PSO [6]
PSO_Bounds	**1**	15	19	266	635	516	445	436	393	636	PSO_Bounds [7]
Monte Carlo	**1**	112	*27e+0/1e6*	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	35	72	*18e+0/300*	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	36	**2.3**	**2.0**	**1.9**	**1.8**	**1.8**	**1.9**	**1.9**	**2.0**	VNS (Garcia) [10]

Table 123: Running time excess ERT/ERT$_{\text{best}}$ on f_{103} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

103 Sphere moderate Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.05	0.28	3.3	21	31	52	66	80	95	123	ERT$_{\text{best}}$/D
ALPS-GA	**1**	90	93	34	36	3613	*81e-4/2e5*	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	61	62	17	15	11	19	51	81	115	AMaLGaM IDEA [4]
BayEDAcG	**1**	73	100	27	29	25	26	25	23	*95e-8/2e3*	BayEDAcG [9]
BFGS	**1**	509	46	8.3	5.9	3.5	**2.8**	**2.3**	**1.9**	**1.5**	BFGS [21]
(1+1)-CMA-ES	**1**	**15**	**3.7**	**1**	**2.5**	12	688	*16e-4/1e4*	.	.	(1+1)-CMA-ES [2]
DASA	**1**	64	17	6.3	87	5751	*75e-4/4e5*	.	.	.	DASA [17]
DEPSO	**1**	42	20	9.0	38	*34e-3/2e3*	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	29	249	103	107	*28e-3/1e5*	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	44	5.2	**1.5**	**1.1**	**1.2**	7.8	29	97	554	full NEWUOA [22]
GLOBAL	**1**	119	17	3.9	4.0	**2.4**	**2.0**	**1.6**	**1.4**	**1.1**	GLOBAL [19]
iAMaLGaM IDEA	**1**	20	20	5.9	7.6	10	21	34	164	422	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	15	5.0	**1.4**	**1.3**	**1.0**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	19	14	5.1	5.7	4.7	6.0	9.3	35	480	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	29	26	15	35	83	91	455	MCS [15]
(1+1)-ES	**1**	15	**3.4**	**1.1**	**1.7**	21	4308	*42e-5/1e6*	.	.	(1+1)-ES [1]
PSO	**1**	**14**	14	438	1655	*66e-3/1e5*	.	.	.	.	PSO [6]
PSO_Bounds	**1**	17	88	2522	*51e-2/1e5*	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	156	*28e+0/1e6*	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	25	8.9	**1.4**	**1**	**1**	**1.7**	**2.6**	3.5	8.6	SNOBFIT [16]
VNS (Garcia)	**1**	37	7.7	**1.8**	**1.6**	**1.2**	**1.3**	**1.2**	**1.3**	**1.3**	VNS (Garcia) [10]

Table 124: Running time excess ERT/ERT$_{\text{best}}$ on f_{104} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

104 Rosenbrock moderate Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	15	48	1185	4283	8566	8897	9124	9293	9472	9809	ERT$_{\text{best}}$/D
ALPS-GA	25	21	60	19	12	17	**24**	**72**	**124**	***31e-5/2e5***	ALPS-GA [14]
AMaLGaM IDEA	10	7.0	**4.7**	**1.9**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	20	16	*26e+0/2e3*	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*13e+4/1e3*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**2.1**	28	*12e+0/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	6.2	11	**2.8**	**3.6**	**4.3**	22	44	158	*24e-5/6e5*	.	DASA [17]
DEPSO	5.9	8.2	*19e+0/2e3*	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	82	47	*16e+0/1e5*	.	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1.1**	**1.2**	20	*13e+0/1e4*	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1.8**	**2.2**	**1**	**1**	**1.7**	**1.7**	*82e-1/900*	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	5.1	**3.0**	32	10	4.9	**4.8**	**4.7**	**4.6**	**4.6**	**4.5**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1.4**	21	*17e+0/1e4*	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	4.8	3.9	592	*14e+0/1e5*	.	.	.	.	.	.	MA-LS-Chain [18]
MCS	27	*20e+1/4e3*	.	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1.0**	**1**	45	439	774	*12e-1/1e6*	.	.	.	.	(1+1)-ES [1]
PSO	493	328	338	*17e+0/1e5*	.	.	.	.	.	.	PSO [6]
PSO_Bounds	33	669	1189	330	*72e+0/1e5*	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	*91e+2/1e6*	.	.	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	*63e+2/300*	.	.	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1.9**	**1.0**	*15e+0/7e5*	.	.	.	.	.	.	.	VNS (Garcia) [10]

Table 125: Running time excess ERT/ERT$_{\text{best}}$ on f_{105} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

105 Rosenbrock moderate unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	15	59	9594	1.23e5	1.73e5	3.10e5	6.77e5	1.85e6	1.86e6	1.87e6	ERT$_{\text{best}}$/D
ALPS-GA	26	18	8.3	**1**	**1**	**1**	**1**	**2.0**	***60e-4/2e5***	.	ALPS-GA [14]
AMaLGaM IDEA	10	5.1	120	**11**	**8.2**	**5.9**	**2.7**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	20	16	*33e+0/2e3*	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*15e+4/1e3*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1.7**	15	*17e+0/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	7.4	14	**1.4**	**1.2**	**9.4**	***26e-2/5e5***	.	.	.	.	DASA [17]
DEPSO	5.8	6.9	*20e+0/2e3*	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	79	40	*17e+0/1e5*	.	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1.0**	**1**	**7.2**	*14e+0/1e4*	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1.8**	**2.5**	**1**	*27e+0/700*	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	4.9	**2.3**	1480	*13e+0/1e6*	.	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1.2**	6.0	*18e+0/1e4*	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	5.0	4.4	146	12	*15e+0/1e5*	.	.	.	.	.	MA-LS-Chain [18]
MCS	52	*19e+1/4e3*	.	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1.4**	4.3	343	*13e+0/1e6*	.	.	.	.	.	.	(1+1)-ES [1]
PSO	5.1	7.1	68	*18e+0/1e5*	.	.	.	.	.	.	PSO [6]
PSO_Bounds	30	957	*78e+0/1e5*	.	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	*88e+2/1e6*	.	.	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	250	*32e+2/300*	.	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**2.0**	33	*16e+0/7e5*	.	.	.	.	.	.	.	VNS (Garcia) [10]

Table 126: Running time excess ERT/ERT$_{\text{best}}$ on f_{106} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

106 Rosenbrock moderate Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	14	29	574	1083	1187	1239	1274	1301	1325	1368	ERT$_{\text{best}}$/D
ALPS-GA	27	36	76	134	935	*12e-2/2e5*	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	11	10	641	1268	1206	1176	1520	**1492**	**1467**	**1423**	AMaLGaM IDEA [4]
BayEDAcG	23	36	*51e+0/2e3*	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	355	*91e+1/4e3*	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1.0**	**1.4**	15	*62e-1/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	5.9	6.7	**2.8**	12	317	*76e-3/9e5*	.	.	.	.	DASA [17]
DEPSO	6.3	12	*25e+0/2e3*	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	88	82	*16e+0/1e5*	.	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1.1**	**1.4**	3.3	12	**28**	*97e-2/1e4*	.	.	.	.	full NEWUOA [22]
GLOBAL	**2.3**	4.0	**1.9**	**5.4**	*22e-1/1e3*	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	5.4	4.8	132	6087	11907	*47e-1/1e6*	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1.5**	**1.4**	**1.1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	5.0	6.9	8.2	18	29	**160**	**1131**	*15e-3/1e5*	.	.	MA-LS-Chain [18]
MCS	84	*20e+1/4e3*	.	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	8.0	214	*42e-2/1e6*	.	.	.	.	.	(1+1)-ES [1]
PSO	6.1	549	2440	*17e+0/1e5*	.	.	.	.	.	.	PSO [6]
PSO_Bounds	50	123	2451	*18e+0/1e5*	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	*98e+2/1e6*	.	.	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	65	*22e+2/300*	.	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**2.2**	**2.1**	**1**	**3.1**	**3.0**	**2.9**	**2.8**	**2.8**	**2.8**	**2.7**	VNS (Garcia) [10]

Table 127: Running time excess $\mathrm{ERT}/\mathrm{ERT}_{\mathrm{best}}$ on f_{107} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

107 Sphere Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
$\mathrm{ERT}_{\mathrm{best}}$/D	0.05	8.8	1029	14757	33566	39960	49573	57958	61110	68294	$\mathrm{ERT}_{\mathrm{best}}$/D
ALPS-GA	**1**	**2.8**	**3.8**	3.1	20	93	*14e-2/2e5*	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	3.0	**4.2**	**1.2**	**1.0**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1**	3.2	**1**	**1**	*15e-1/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	355	*11e+1/1e3*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	322	*75e+0/1e4*	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	1817	*64e+0/3e5*	.	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	6.4	*38e+0/2e3*	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	819	1438	*25e+0/1e5*	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	321	*68e+0/1e4*	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	7.5	*82e+0/400*	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.5**	8.0	4.8	**2.2**	**2.0**	**1.6**	**1.4**	**1.6**	**1.8**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	257	10	**1.4**	4.5	*11e-1/1e4*	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	4.5	**1.2**	**1**	**1.2**	**1.2**	**1.3**	**1.5**	**11**	MA-LS-Chain [18]
MCS	**1**	19	*64e+0/4e3*	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	139	*34e+0/1e6*	.	.	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	1742	*48e+0/1e5*	.	.	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	15	*64e+0/1e5*	.	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	4.8	*27e+0/1e6*	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	3.5	*65e+0/300*	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	125	109	350	*27e-1/7e5*	.	.	.	.	.	VNS (Garcia) [10]

Table 128: Running time excess ERT/ERT$_{\text{best}}$ on f_{108} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

108 Sphere unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.05	19	86299	7.94e5	6.81e6	nan	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.4**	***24e+0/2e5***	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.3**	**1**	**1**	***48e-2/1e6***	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	10	***72e+0/2e3***	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	123	***11e+1/800***	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	191	***80e+0/1e4***	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	875	***64e+0/3e5***	.	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	43	***81e+0/2e3***	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	3446	***91e+0/1e5***	.	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	1589	***11e+1/1e4***	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	4.5	***80e+0/300***	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	20	**2.6**	**1.7**	**1**	***85e-2/1e6***	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	417	***72e+0/1e4***	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	***21e+0/1e5***	.	.	.	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	19	***69e+0/4e3***	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	116	***41e+0/1e6***	.	.	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	3446	***95e+0/1e5***	.	.	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	5904	***10e+1/1e5***	.	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**2.2**	***28e+0/1e6***	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**2.5**	***67e+0/300***	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	634	***37e+0/7e5***	.	.	.	.	.	.	.	VNS (Garcia) [10]

Table 129: Running time excess ERT/ERT$_{\text{best}}$ on f_{109} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

109 Sphere Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.05	0.28	17	32	57	84	114	150	179	248	ERT$_{\text{best}}$/D
ALPS-GA	**1**	70	20	*18e-1/2e5*	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	61	9.1	26	46	67	63	**53**	**65**	**69**	AMaLGaM IDEA [4]
BayEDAcG	**1**	93	20	23	25	**27**	**24**	100	*26e-5/2e3*	.	BayEDAcG [9]
BFGS	**1**	6666	607	493	563	382	280	214	179	129	BFGS [21]
(1+1)-CMA-ES	**1**	**12**	11	*16e-1/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	957	41957	*12e+0/3e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	49	7.2	97	*99e-2/2e3*	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	25	2538	*74e-1/1e5*	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	93	23	*29e-1/1e4*	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	50	**3.0**	191	*25e-1/400*	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	25	4.0	8.5	**20**	63	311	438	428	368	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**11**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	20	3.9	**4.9**	858	*54e-3/1e5*	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	20	280	985	667	490	*13e-1/4e3*	.	.	MCS [15]
(1+1)-ES	**1**	20	5.7	3846	*72e-2/1e6*	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	15	2634	*61e-1/1e5*	.	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	41	24361	*17e+0/1e5*	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	100	*28e+0/1e6*	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	23	16	*94e-1/300*	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	37	**1.6**	**1.4**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	VNS (Garcia) [10]

Table 130: Running time excess ERT/ERT$_{\text{best}}$ on f_{110} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

110 Rosenbrock Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	206	2229	nan	nan	nan	nan	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	5.1	30	***56e+0/2e5***	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1.2**	**1.0**	***18e+0/1e6***	.	.	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	3.3	**1**	***70e+0/2e3***	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*14e+4/600*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	*46e+3/1e4*	.	.	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	*28e+3/3e5*	.	.	.	.	.	.	.	.	.	DASA [17]
DEPSO	*72e+2/2e3*	.	.	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	39	53	***11e+1/1e5***	.	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	*65e+3/1e4*	.	.	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	*46e+3/300*	.	.	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**3.2**	***18e+0/1e6***	.	.	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	16	8.0	***60e+0/1e4***	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**3.0**	6.1	***28e+0/1e5***	.	.	.	.	.	.	.	MA-LS-Chain [18]
MCS	*14e+3/4e3*	.	.	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	*11e+3/1e6*	.	.	.	.	.	.	.	.	.	(1+1)-ES [1]
PSO	381	*85e+1/1e5*	.	.	.	.	.	.	.	.	PSO [6]
PSO_Bounds	3170	*58e+2/1e5*	.	.	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	*80e+2/1e6*	.	.	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	*36e+3/300*	.	.	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	22	73	***47e+0/7e5***	.	.	.	.	.	.	.	VNS (Garcia) [10]

Table 131: Running time excess ERT/ERT$_{\text{best}}$ on f_{111} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

111 Rosenbrock unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	7558	53627	nan	nan	nan	nan	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	48	***99e+1/2e5***	.	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	***23e+0/1e6***	.	.	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	4.0	***22e+2/2e3***	.	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*15e+4/400*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	*44e+3/1e4*	.	.	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	*35e+3/3e5*	.	.	.	.	.	.	.	.	.	DASA [17]
DEPSO	*77e+3/2e3*	.	.	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	*36e+3/1e5*	.	.	.	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	*11e+4/1e4*	.	.	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	*58e+3/200*	.	.	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**2.4**	**2.7**	***27e+0/1e6***	.	.	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**3.3**	***15e+2/1e4***	.	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	196	***17e+2/1e5***	.	.	.	.	.	.	.	.	MA-LS-Chain [18]
MCS	*21e+3/4e3*	.	.	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	*15e+3/1e6*	.	.	.	.	.	.	.	.	.	(1+1)-ES [1]
PSO	*51e+3/1e5*	.	.	.	.	.	.	.	.	.	PSO [6]
PSO_Bounds	*48e+3/1e5*	.	.	.	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	*94e+2/1e6*	.	.	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	*34e+3/300*	.	.	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	*76e+2/7e5*	.	.	.	.	.	.	.	.	.	VNS (Garcia) [10]

Table 132: Running time excess ERT/ERT$_{\text{best}}$ on f_{112} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

112 Rosenbrock Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	14	43	1426	3206	3481	3609	3678	3745	3807	3912	ERT$_{\text{best}}$/D
ALPS-GA	27	40	*21e+0/2e5*	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	11	7.5	236	783	926	916	1220	1199	1182	1151	AMaLGaM IDEA [4]
BayEDAcG	21	23	*48e+0/2e3*	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*14e+4/2e3*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1.0**	3.7	*20e+0/1e4*	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	6.1	84	*18e+0/4e5*	.	.	.	.	.	.	.	DASA [17]
DEPSO	5.6	18	*37e+0/2e3*	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	80	54	*27e+0/1e5*	.	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	4.1	*19e+0/1e4*	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**2.0**	**2.3**	**1.9**	*34e+0/500*	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	5.1	3.3	487	**556**	**517**	**500**	**492**	**483**	**476**	**464**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1.3**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	4.7	4.6	*16e+0/1e5*	.	.	.	.	.	.	.	MA-LS-Chain [18]
MCS	108	*20e+1/4e3*	.	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1.0**	**2.7**	4743	*15e+0/1e6*	.	.	.	.	.	.	(1+1)-ES [1]
PSO	5.5	1202	*78e+0/1e5*	.	.	.	.	.	.	.	PSO [6]
PSO_Bounds	40	15058	*24e+1/1e5*	.	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	*76e+2/1e6*	.	.	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	40	*15e+2/300*	.	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**2.1**	**1.4**	**1.1**	**2.6**	**2.6**	**2.6**	**2.6**	**2.5**	**2.5**	**2.5**	VNS (Garcia) [10]

Table 133: Running time excess ERT/ERT$_{\text{best}}$ on f_{113} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

113 Step-ellipsoid Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.59	90	6769	21925	34752	58057	58117	58117	58117	58488	ERT$_{\text{best}}$/D
ALPS-GA	3.8	8.7	13	***58e-1/2e5***	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	4.6	**1.8**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	3.6	6.3	*19e+0/2e3*	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	239	*58e+1/1e3*	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	425	*22e+1/1e4*	.	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	2682	*20e+1/3e5*	.	.	.	.	.	.	.	.	DASA [17]
DEPSO	7.4	52	*14e+1/2e3*	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	5.8	1075	*86e+0/1e5*	.	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	833	*38e+1/1e4*	.	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1.7**	*28e+1/400*	.	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**2.9**	**1**	**1.9**	**3.6**	**3.3**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	27	70	**4.4**	***21e+0/1e4***	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**2.4**	**6.1**	10	***62e-1/1e5***	.	.	.	.	.	.	MA-LS-Chain [18]
MCS	58	628	*22e+1/4e3*	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	103	1.64e5	*13e+1/1e6*	.	.	.	.	.	.	.	(1+1)-ES [1]
PSO	**2.8**	3376	*15e+1/1e5*	.	.	.	.	.	.	.	PSO [6]
PSO_Bounds	**2.6**	15624	*20e+1/1e5*	.	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	3.9	10298	*95e+0/1e6*	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	7.5	*32e+1/300*	.	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	74	402	***12e+0/6e5***	.	.	.	.	.	.	VNS (Garcia) [10]

Table 134: Running time excess ERT/ERT$_{\text{best}}$ on f_{114} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

114 Step-ellipsoid unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.59	5352	1.29e5	1.90e6	4.50e6	7.01e6	7.01e6	7.01e6	7.01e6	7.01e6	ERT$_{\text{best}}$/D
ALPS-GA	3.7	15	***70e+0/2e5***	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	3.2	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**2.8**	*32e+1/2e3*	.	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	216	*67e+1/700*	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	506	*34e+1/1e4*	.	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	2268	*27e+1/3e5*	.	.	.	.	.	.	.	.	DASA [17]
DEPSO	32	*49e+1/2e3*	.	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	3.6	*30e+1/1e5*	.	.	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	1044	*53e+1/1e4*	.	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**2.5**	*36e+1/300*	.	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**2.8**	**3.7**	**3.4**	**7.7**	***27e-1/1e6***	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	2673	14	***17e+1/1e4***	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	3.2	**4.2**	***67e+0/1e5***	.	.	.	.	.	.	.	MA-LS-Chain [18]
MCS	207	*30e+1/4e3*	.	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	234	*16e+1/1e6*	.	.	.	.	.	.	.	.	(1+1)-ES [1]
PSO	80	*26e+1/1e5*	.	.	.	.	.	.	.	.	PSO [6]
PSO_Bounds	12114	*37e+1/1e5*	.	.	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	3.5	450	***11e+1/1e6***	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	7.4	*37e+1/300*	.	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	282	***11e+1/6e5***	.	.	.	.	.	.	.	VNS (Garcia) [10]

Table 135: Running time excess ERT/ERT$_{\text{best}}$ on f_{115} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

115 Step-ellipsoid Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.53	18	156	1513	4587	6334	6340	6340	6340	6450	ERT$_{\text{best}}$/D
ALPS-GA	4.1	11	244	*54e-1/2e5*	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	3.3	6.1	**1.7**	**1.2**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**2.6**	13	17	*90e-1/2e3*	.	.	.	.	.	.	BayEDAcG [9]
BFGS	1911	*62e+1/2e3*	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	3.9	3.5	*21e+0/1e4*	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	21	319	*41e+0/3e5*	.	.	.	.	.	.	.	DASA [17]
DEPSO	3.2	3.8	15	*93e-1/2e3*	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	**2.7**	23	2730	*16e+0/1e5*	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	17	**2.5**	89	*10e+0/1e4*	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	3.5	**2.6**	*29e+0/300*	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**2.4**	**2.6**	**1.0**	**1.7**	**2.4**	**7.0**	**7.0**	**7.0**	**7.0**	**6.9**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**2.5**	**1**	**1**	**1**	**1.9**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**2.4**	**2.7**	4.4	465	*15e-1/1e5*	.	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	91	*72e+0/4e3*	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	7.5	4.7	93812	*14e+0/1e6*	.	.	.	.	.	.	(1+1)-ES [1]
PSO	**2.1**	223	*32e+0/1e5*	.	.	.	.	.	.	.	PSO [6]
PSO_Bounds	**2.7**	11	*47e+0/1e5*	.	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	3.1	1.44e5	*11e+1/1e6*	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	3.3	100	*14e+1/300*	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1.1**	**1.4**	3.5	100	351	1190	1189	1189	1189	1169	VNS (Garcia) [10]

Table 136: Running time excess ERT/ERT$_{\text{best}}$ on f_{116} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

116 Ellipsoid Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	1812	9507	24887	34689	44640	52062	61332	75140	76648	79736	ERT$_{\text{best}}$/D
ALPS-GA	**10**	***30e+1/2e5***	.	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	*24e+2/2e3*	.	.	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*55e+3/700*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	*16e+3/1e4*	.	.	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	*95e+2/3e5*	.	.	.	.	.	.	.	.	.	DASA [17]
DEPSO	*16e+3/2e3*	.	.	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	781	***41e+2/1e5***	.	.	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	*23e+3/1e4*	.	.	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	*23e+3/300*	.	.	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**2.4**	**5.4**	**3.7**	**2.9**	**2.5**	**2.5**	**2.1**	**1.7**	**1.7**	**1.8**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	26	***13e+2/1e4***	.	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	25	***57e+1/1e5***	.	.	.	.	.	.	.	.	MA-LS-Chain [18]
MCS	*12e+3/4e3*	.	.	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	*59e+2/1e6*	.	.	.	.	.	.	.	.	.	(1+1)-ES [1]
PSO	*60e+2/1e5*	.	.	.	.	.	.	.	.	.	PSO [6]
PSO_Bounds	*72e+2/1e5*	.	.	.	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	*44e+2/1e6*	.	.	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	*18e+3/300*	.	.	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	675	***14e+2/5e5***	.	.	.	.	.	.	.	.	VNS (Garcia) [10]

Table 137: Running time excess ERT/ERT$_{\text{best}}$ on f_{117} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

117 Ellipsoid unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	30904	2.02e5	1.28e6	2.05e6	nan	nan	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	***32e+2/2e5***	.	.	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1**	**1**	***90e-1/1e6***	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	***13e+3/2e3***	.	.	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	***49e+3/500***	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	***18e+3/1e4***	.	.	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	***12e+3/3e5***	.	.	.	.	.	.	.	.	.	DASA [17]
DEPSO	***26e+3/2e3***	.	.	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	***13e+3/1e5***	.	.	.	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	***32e+3/1e4***	.	.	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	***26e+3/200***	.	.	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**2.5**	**2.3**	**2.5**	**7.0**	***19e+0/1e6***	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	***99e+2/1e4***	.	.	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	***36e+2/1e5***	.	.	.	.	.	.	.	.	.	MA-LS-Chain [18]
MCS	***20e+3/4e3***	.	.	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	***69e+2/1e6***	.	.	.	.	.	.	.	.	.	(1+1)-ES [1]
PSO	***15e+3/1e5***	.	.	.	.	.	.	.	.	.	PSO [6]
PSO_Bounds	***17e+3/1e5***	.	.	.	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	***44e+2/1e6***	.	.	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	***24e+3/300***	.	.	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	***94e+2/5e5***	.	.	.	.	.	.	.	.	.	VNS (Garcia) [10]

Table 138: Running time excess ERT/ERT$_{\text{best}}$ on f_{118} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

118 Ellipsoid Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	26	184	345	589	876	1110	1317	1394	1503	1633	ERT$_{\text{best}}$/D
ALPS-GA	32	341	*46e+0/2e5*	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	6.9	**1.9**	**1.4**	**1.9**	**2.9**	**6.8**	**7.3**	**7.3**	**8.8**	**8.8**	AMaLGaM IDEA [4]
BayEDAcG	124	*10e+2/2e3*	.	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*46e+3/2e3*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	3.8	406	*13e+1/1e4*	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	236	*32e+1/5e5*	.	.	.	.	.	.	.	.	DASA [17]
DEPSO	18	*55e+1/2e3*	.	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	58	3551	*31e+1/1e5*	.	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	7.6	*44e+0/1e4*	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**3.0**	85	*15e+1/1e3*	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	3.9	**1**	**2.4**	4.4	6.9	14	34	40	47	44	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**3.5**	**2.3**	**2.2**	**1.8**	**1.4**	**1.3**	**1.1**	**1.1**	**1.1**	**1.0**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	9.0	8.8	474	*10e+0/1e5*	.	.	.	.	.	.	MA-LS-Chain [18]
MCS	*26e+2/4e3*	.	.	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	18	*18e+1/1e6*	.	.	.	.	.	.	.	.	(1+1)-ES [1]
PSO	598	*56e+1/1e5*	.	.	.	.	.	.	.	.	PSO [6]
PSO_Bounds	2594	*78e+1/1e5*	.	.	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	*53e+2/1e6*	.	.	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	*54e+2/300*	.	.	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	3.6	**1.0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	VNS (Garcia) [10]

Table 139: Running time excess ERT/ERT$_{\text{best}}$ on f_{119} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

119 Sum of different powers Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.05	0.05	139	5717	21332	46929	63472	67765	69961	95143	ERT$_{\text{best}}$/D
ALPS-GA	**1**	6.4	3.6	14	81	***31e-2/2e5***	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**3.8**	**1**	**1.7**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1**	5.7	**2.7**	**1**	*15e-1/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	743	*43e+0/1e3*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	415	*17e+0/1e4*	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	2286	27207	*17e+0/3e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	4.6	13	*83e-1/2e3*	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	6.6	682	*95e-1/1e5*	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	721	1046	*18e+0/1e4*	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	5.1	*21e+0/400*	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	5.3	4.2	5.8	**3.7**	**2.4**	**2.4**	**2.6**	**2.8**	**2.1**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	21	41	**5.2**	**7.0**	***16e-1/1e4***	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	5.7	**2.5**	12	16	***13e-2/1e5***	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	87	*14e+0/4e3*	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	252	7268	*97e-1/1e6*	.	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	3.9	1097	*11e+0/1e5*	.	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	6.5	1998	*12e+0/1e5*	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	5.7	1781	*84e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	4.9	*18e+0/300*	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**3.6**	143	325	*18e-1/5e5*	.	.	.	.	.	VNS (Garcia) [10]

Table 140: Running time excess ERT/ERT$_{\text{best}}$ on f_{120} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

120 Sum of different powers unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.05	0.05	2317	5.07e5	nan	nan	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	**1**	4.9	**5.2**	***58e-1/2e5***	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	7.3	**4.3**	**1**	***37e-2/1e6***	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1.1**	4.6	*20e+0/2e3*	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	469	*34e+0/800*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	992	*20e+0/1e4*	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	1272	*20e+0/3e5*	.	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	10	*31e+0/2e3*	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	4.2	292	***27e+0/1e5***	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	3307	*34e+0/1e4*	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	5.3	*24e+0/300*	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	3.7	7.9	**2.1**	***39e-2/1e6***	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	6339	32	***17e+0/1e4***	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	6.3	**1**	***56e-1/1e5***	.	.	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	12	***15e+0/4e3***	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	424	1929	***11e+0/1e6***	.	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	5.3	*27e+0/1e5*	.	.	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	8.5	*25e+0/1e5*	.	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1.1**	3.9	97	***81e-1/1e6***	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**3.5**	*19e+0/300*	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**3.6**	353	***10e+0/6e5***	.	.	.	.	.	.	VNS (Garcia) [10]

Table 141: Running time excess ERT/ERT$_{\text{best}}$ on f_{121} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

121 Sum of different powers Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.05	0.05	12	38	71	172	465	1099	1722	2870	ERT$_{\text{best}}$/D
ALPS-GA	**1**	4.7	13	*20e-1/2e5*	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	6.5	6.4	**6.0**	47	**36**	**25**	**13**	**15**	**20**	AMaLGaM IDEA [4]
BayEDAcG	**1**	5.3	20	33	**43**	*58e-3/2e3*	.	.	.	.	BayEDAcG [9]
BFGS	**1**	2506	*33e+0/2e3*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	23	33	*32e-1/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	65	76199	*11e+0/3e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	10	7.7	134	*11e-1/2e3*	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	5.7	2037	*50e-1/1e5*	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	125	73	*53e-1/1e4*	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	7.4	4.8	*62e-1/400*	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	5.1	**3.4**	12	57	149	121	75	50	39	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	15	**1**	**1**	**1**	**1**	**1.2**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	4.5	3.9	97	9693	*18e-2/1e5*	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	16	*60e-1/4e3*	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1.1**	25	17	*16e-1/1e6*	.	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**3.5**	1756	*64e-1/1e5*	.	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	4.7	4065	*85e-1/1e5*	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	3.9	25722	*82e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	5.7	*16e+0/300*	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**3.6**	**1.8**	**1.2**	**1.3**	**1.1**	**1**	**1.2**	**1.1**	**1.2**	VNS (Garcia) [10]

Table 142: Running time excess ERT/ERT$_{\text{best}}$ on f_{122} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

122 Schaffer F7 Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.05	0.05	35	42522	1.32e5	2.10e5	2.30e5	2.43e5	6.62e5	1.58e6	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.4**	**2.3**	***22e-1/2e5***	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.3**	**1.4**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.1**	**2.4**	***34e-1/2e3***	.	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	81	664	***13e+0/2e3***	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1.5**	148	***82e-1/1e4***	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	60	1100	***75e-1/3e5***	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1.1**	3.1	***63e-1/2e3***	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1.3**	23	***59e-1/1e5***	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	7.0	182	***76e-1/1e4***	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1.3**	8.4	***92e-1/400***	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.3**	**1**	**2.7**	**1.7**	**1.4**	**1.8**	**1.9**	**2.1**	**4.5**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	5.2	65	***44e-1/1e4***	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.3**	**1.0**	***27e-1/1e5***	.	.	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	16	***77e-1/4e3***	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	37	196	***57e-1/1e6***	.	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1.5**	4.7	***67e-1/1e5***	.	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1.3**	737	***80e-1/1e5***	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1.3**	12	***49e-1/1e6***	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.1**	7.3	***98e-1/300***	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1.2**	3.1	***36e-1/5e5***	.	.	.	.	.	.	VNS (Garcia) [10]

Table 143: Running time excess ERT/ERT$_{\text{best}}$ on f_{123} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

123 Schaffer F7 unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.05	0.05	53	1.45e7	nan	nan	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.6**	**3.1**	***46e-1/2e5***	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.4**	**1.9**	**1**	***23e-1/1e6***	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.4**	14	***83e-1/2e3***	.	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	35	*14e+0/900*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	8.5	130	***94e-1/1e4***	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	141	619	***74e-1/3e5***	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1.3**	269	***12e+0/2e3***	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1.4**	5215	***13e+0/1e5***	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**2.6**	248	***99e-1/1e4***	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1.2**	7.3	***99e-1/300***	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.5**	12	***23e-1/1e6***	.	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.5**	154	***77e-1/1e4***	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.5**	**1**	***45e-1/1e5***	.	.	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	58	***87e-1/4e3***	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	53	199	***64e-1/1e6***	.	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1.3**	733	***92e-1/1e5***	.	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1.5**	2205	***10e+0/1e5***	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1.1**	7.4	***53e-1/1e6***	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.4**	7.0	***10e+0/300***	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1.2**	405	***58e-1/5e5***	.	.	.	.	.	.	VNS (Garcia) [10]

Table 144: Running time excess ERT/ERT$_{\text{best}}$ on f_{124} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

124 Schaffer F7 Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.05	0.05	10	98	4571	6224	14010	34287	64191	92581	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.5**	4.9	*28e-1/2e5*	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.5**	4.6	11	**1.5**	**2.6**	**2.1**	**1.8**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.1**	8.7	13	*37e-2/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	120	*13e+0/2e3*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	3.7	14	*51e-1/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	12	467	*69e-1/3e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1.9**	3.6	*28e-1/2e3*	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1.4**	7.6	*60e-1/1e5*	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1.5**	117	*66e-1/1e4*	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1.5**	4.1	*69e-1/300*	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1.4**	**2.8**	**7.8**	8.3	**14**	**7.8**	**3.4**	**1.9**	**1.9**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	3.3	**1**	**7.1**	**1**	**1**	**1**	**1**	***41e-5/1e4***	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1.3**	**1.2**	15201	*16e-1/1e5*	.	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	12	*66e-1/4e3*	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	4.3	66	*36e-1/1e6*	.	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1.2**	158	*54e-1/1e5*	.	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1.7**	35	*57e-1/1e5*	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1.1**	46	*51e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1.2**	6.7	*85e-1/300*	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1.2**	**1.9**	**1**	**3.6**	510	*24e-3/4e5*	.	.	.	VNS (Garcia) [10]

Table 145: Running time excess ERT/ERT$_{\text{best}}$ on f_{125} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

125 Griewank-Rosenbrock Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.05	0.05	0.05	0.05	0.05	nan	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1**	2470	***38e-2/2e5***	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.1**	1013	***24e-2/1e6***	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.1**	1796	***50e-2/2e3***	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	53	*21e-1/2e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1**	1.93e5	***96e-2/1e4***	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	**1.1**	2.42e7	***11e-1/3e5***	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	**1.2**	7833	***81e-2/2e3***	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1**	**1.2**	3.12e5	***40e-2/1e5***	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	**1.7**	**856**	***44e-2/1e4***	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.1**	*14e-1/400*	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**1.1**	**681**	***24e-2/1e6***	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1**	20422	***59e-2/1e4***	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.2**	1496	***39e-2/1e5***	.	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1**	***25e-3/4e3***	.	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	**1**	6.52e5	***75e-2/1e6***	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1**	**1.1**	2.88e5	***72e-2/1e5***	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1**	**1.1**	1.41e6	***86e-2/1e5***	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1**	5.89e5	***80e-2/1e6***	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1.1**	1629	***91e-2/300***	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1**	42410	***44e-2/2e6***	.	.	.	.	.	VNS (Garcia) [10]

Table 146: Running time excess ERT/ERT$_{\text{best}}$ on f_{126} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

126 Griewank-Rosenbrock unif

Δftarget ERT$_{\text{best}}$/D	1e+03 0.05	1e+02 0.05	1e+01 0.05	1e+00 0.05	1e-01 0.05	1e-02 nan	1e-03 nan	1e-04 nan	1e-05 nan	1e-07 nan	Δftarget ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1**	2474	***57e-2/2e5***	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1**	**1320**	***31e-2/1e6***	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1**	32579	***94e-2/2e3***	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	23	*17e-1/1e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1**	1.41e6	***11e-1/1e4***	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	81	7.73e7	***12e-1/3e5***	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	**1.1**	*13e-1/2e3*	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1**	**1.2**	2.30e6	***10e-1/1e5***	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	311	*16e-1/1e4*	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.1**	*14e-1/300*	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**1.1**	5691	***34e-2/1e6***	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1**	1.81e5	***89e-2/1e4***	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.1**	2511	***52e-2/1e5***	.	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1**	***25e-3/4e3***	.	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	**1**	3.07e6	***85e-2/1e6***	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1**	**1.1**	3.10e6	***10e-1/1e5***	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1**	**1**	*14e-1/1e5*	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1.1**	3.15e5	***76e-2/1e6***	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1**	**1422**	***86e-2/300***	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1**	1.31e6	***67e-2/2e6***	.	.	.	.	.	VNS (Garcia) [10]

Table 147: Running time excess ERT/ERT$_{\text{best}}$ on f_{127} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

127 Griewank-Rosenbrock Cauchy

Δftarget ERT$_{\text{best}}$/D	1e+03 0.05	1e+02 0.05	1e+01 0.05	1e+00 0.05	1e-01 0.05	1e-02 1.03e6	1e-03 1.49e7	1e-04 1.49e7	1e-05 1.49e7	1e-07 1.49e7	Δftarget ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1.3**	1427	*46e-2/2e5*	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.1**	756	1.47e6	**1**	***83e-4/1e6***	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.1**	1607	*42e-2/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	140	*20e-1/2e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1**	29546	*81e-2/1e4*	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	**1**	7.50e7	*11e-1/3e5*	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	**1.1**	946	*65e-2/2e3*	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1**	**1.1**	9.71e5	*73e-2/1e5*	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	**1**	1360	*44e-2/1e4*	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**1.1**	*15e-1/300*	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**1**	560	3.33e6	**1.5**	**1**	**1**	**1**	**1**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1**	**181**	**1.70e5**	***83e-3/1e4***	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	**1.1**	416	*43e-2/1e5*	.	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	**1**	**1**	**1**	***25e-3/4e3***	.	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	**1.3**	28036	*62e-2/1e6*	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1**	**1**	1.22e6	*86e-2/1e5*	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1**	**1.1**	2.28e6	*99e-2/1e5*	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1**	**1.3**	5.25e5	*79e-2/1e6*	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	**1.1**	1704	*87e-2/300*	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	**1**	**346**	**1.08e6**	***45e-3/2e6***	.	.	.	.	VNS (Garcia) [10]

Table 148: Running time excess ERT/ERT$_{\text{best}}$ on f_{128} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

128 Gallagher Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.05	0.05	1.10e5	7.82e5	9.07e5	9.14e5	9.20e5	9.26e5	9.30e5	9.42e5	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	15	**4.5**	**4.1**	***34e+0/2e5***	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	*45e+0/2e3*	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	*75e+0/1e3*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	*66e+0/1e4*	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	*61e+0/3e5*	.	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	*66e+0/2e3*	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1**	*73e+0/1e5*	.	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	*71e+0/1e4*	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	*69e+0/400*	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	**3.9**	**4.2**	**16**	**16**	**16**	**16**	**16**	**15**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1.4**	*65e+0/1e4*	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	14	*30e+0/1e5*	.	.	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	*66e+0/4e3*	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	*34e+0/1e6*	.	.	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1**	*67e+0/1e5*	.	.	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1**	*72e+0/1e5*	.	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1**	*24e+0/1e6*	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	*68e+0/300*	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	128	*35e+0/1e6*	.	.	.	.	.	.	VNS (Garcia) [10]

Table 149: Running time excess ERT/ERT$_{\text{best}}$ on f_{129} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

129 Gallagher unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.05	0.05	7.15e6	1.47e7	nan	nan	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	***32e+0/2e5***	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1**	**1**	***23e+0/1e6***	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	***69e+0/2e3***	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	***76e+0/900***	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	***70e+0/1e4***	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	***58e+0/3e5***	.	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	***72e+0/2e3***	.	.	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1**	***70e+0/1e5***	.	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	***75e+0/1e4***	.	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	***68e+0/300***	.	.	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	***31e+0/1e6***	.	.	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	***69e+0/1e4***	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	***27e+0/1e5***	.	.	.	.	.	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	***67e+0/4e3***	.	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	***48e+0/1e6***	.	.	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1**	***67e+0/1e5***	.	.	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1**	***70e+0/1e5***	.	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1**	***24e+0/1e6***	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	***67e+0/300***	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	***56e+0/7e5***	.	.	.	.	.	.	.	VNS (Garcia) [10]

Table 150: Running time excess ERT/ERT$_{\text{best}}$ on f_{130} in **20-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

130 Gallagher Cauchy

∆ftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	∆ftarget
ERT$_{\text{best}}$/D	0.05	0.05	245	4657	12618	12648	12688	12729	12755	12860	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	17	757	*21e-1/2e5*	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	7.1	217	81	83	83	**83**	**83**	**85**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	10	*99e-1/2e3*	.	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	137	*75e+0/2e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**2.5**	*25e-1/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	7521	*19e+0/3e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	6.3	**6.3**	*62e-1/2e3*	.	.	.	.	.	DEPSO [11]
EDA-PSO	**1**	**1**	5715	*49e+0/1e5*	.	.	.	.	.	.	EDA-PSO [5]
full NEWUOA	**1**	**1**	19	*70e-1/1e4*	.	.	.	.	.	.	full NEWUOA [22]
GLOBAL	**1**	**1**	**1**	**1**	*72e-1/300*	.	.	.	.	.	GLOBAL [19]
iAMaLGaM IDEA	**1**	**1**	5.6	74	**38**	**42**	**67**	91	126	322	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**2.0**	**1.7**	**1**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
MA-LS-Chain	**1**	**1**	24	87	**32**	**38**	118	*21e-1/1e5*	.	.	MA-LS-Chain [18]
MCS	**1**	**1**	37	*12e+0/4e3*	.	.	.	.	.	.	MCS [15]
(1+1)-ES	**1**	**1**	4.2	198	*74e-2/1e6*	.	.	.	.	.	(1+1)-ES [1]
PSO	**1**	**1**	1632	*17e+0/1e5*	.	.	.	.	.	.	PSO [6]
PSO_Bounds	**1**	**1**	5711	*50e+0/1e5*	.	.	.	.	.	.	PSO_Bounds [7]
Monte Carlo	**1**	**1**	*25e+0/1e6*	.	.	.	.	.	.	.	Monte Carlo [3]
SNOBFIT	**1**	**1**	*62e+0/300*	.	.	.	.	.	.	.	SNOBFIT [16]
VNS (Garcia)	**1**	**1**	69	78	48	48	**48**	**48**	**48**	**47**	VNS (Garcia) [10]

Table 151: Running time excess ERT/ERT$_{\text{best}}$ on f_{101} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

101 Sphere moderate Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.03	6.5	15	23	31	39	48	56	64	81	ERT$_{\text{best}}$/D
ALPS-GA	**1**	13	29	37	41	45	48	52	55	68	ALPS-GA [14]
AMaLGaM IDEA	**1**	25	37	40	39	38	36	37	37	35	AMaLGaM IDEA [4]
BayEDAcG	**1**	37	40	39	38	38	41	*25e-5/2e3*	.	.	BayEDAcG [9]
BFGS	**1**	*30e+1/2e3*	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	(1+1)-CMA-ES [2]
DASA	**1**	4.4	5.0	5.7	6.4	7.2	7.7	7.9	8.2	**8.5**	DASA [17]
DEPSO	**1**	4.7	10	31	*17e-2/2e3*	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**1**	8.9	11	12	13	13	13	13	13	13	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.2**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	IPOP-SEP-CMA-ES [20]
(1+1)-ES	**1**	**2.0**	**2.6**	**2.3**	**2.3**	**2.8**	**3.4**	**4.4**	**4.7**	13	(1+1)-ES [1]
Monte Carlo	**1**	*14e+1/1e6*	.	.	.	.	.	.	.	.	Monte Carlo [3]

Table 152: Running time excess ERT/ERT$_{\text{best}}$ on f_{102} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

102 Sphere moderate unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.03	8.4	21	32	44	55	66	77	89	113	ERT$_{\text{best}}$/D
ALPS-GA	**1**	11	23	28	32	35	38	40	43	59	ALPS-GA [14]
AMaLGaM IDEA	**1**	22	30	27	27	26	27	26	**26**	**26**	AMaLGaM IDEA [4]
BayEDAcG	**1**	30	29	28	28	28	28	*29e-5/2e3*	.	.	BayEDAcG [9]
BFGS	**1**	*29e+1/2e3*	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1.5**	**1.3**	**1.1**	**1.0**	**1.5**	**3.7**	**11**	31	*19e-7/1e4*	(1+1)-CMA-ES [2]
DASA	**1**	5.3	14	16	102	1247	66129	*42e-4/3e5*	.	.	DASA [17]
DEPSO	**1**	**4.0**	**7.1**	23	227	*16e-2/2e3*	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**1**	6.4	8.0	**8.7**	**9.1**	**9.2**	**10**	**10**	**10**	**10**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
(1+1)-ES	**1**	57	3870	4.40e5	*27e-1/1e6*	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	**1**	*13e+1/1e6*	.	.	.	.	.	.	.	.	Monte Carlo [3]

Table 153: Running time excess ERT/ERT$_{\text{best}}$ on f_{103} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

103 Sphere moderate Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.03	5.9	13	31	42	54	68	82	95	124	ERT$_{\text{best}}$/D
ALPS-GA	**1**	15	34	28	121	*41e-3/1e5*	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	24	47	30	26	24	**22**	**36**	**68**	**128**	AMaLGaM IDEA [4]
BayEDAcG	**1**	41	44	29	28	31	29	*33e-5/2e3*	.	.	BayEDAcG [9]
BFGS	**1**	73	48	29	21	**17**	**13**	**12**	**10**	**8.0**	BFGS [21]
(1+1)-CMA-ES	**1**	**1.3**	**1.1**	**1.1**	**5.3**	1286	*13e-3/1e4*	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	4.2	6.1	5.1	258	*36e-3/3e5*	.	.	.	.	DASA [17]
DEPSO	**1**	5.2	12	62	*79e-2/2e3*	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**1**	10	13	9.1	12	**21**	49	85	350	562	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.3**	**1.5**	**1.0**	**1**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
(1+1)-ES	**1**	**1**	**1**	**1**	**6.5**	22561	*84e-4/1e6*	.	.	.	(1+1)-ES [1]
Monte Carlo	**1**	*14e+1/1e6*	.	.	.	.	.	.	.	.	Monte Carlo [3]

Table 154: Running time excess ERT/ERT$_{\text{best}}$ on f_{104} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

104 Rosenbrock moderate Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	19	243	77238	3.04e5	3.39e5	3.42e5	3.45e5	3.47e5	3.49e5	3.53e5	ERT$_{\text{best}}$/D
ALPS-GA	34	21	**1**	**1**	**2.6**	**5.3**	***14e-1/1e5***	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	23	**3.3**	**4.1**	**1.1**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	31	7.9	*63e+0/2e3*	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*50e+4/1e3*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	*39e+0/1e4*	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	5.5	45	**4.9**	9.0	*74e-1/4e5*	.	.	.	.	.	DASA [17]
DEPSO	13	13	*96e+0/2e3*	.	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	9.4	**1.3**	18	**6.0**	**6.3**	**7.5**	**7.4**	**7.4**	**7.3**	**7.3**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1.3**	5.3	*37e+0/1e4*	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
(1+1)-ES	**1.5**	24	*45e+0/1e6*	.	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	*93e+3/1e6*	.	.	.	.	.	.	.	.	.	Monte Carlo [3]

Table 155: Running time excess ERT/ERT$_{\text{best}}$ on f_{105} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

105 Rosenbrock moderate unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	24	310	2.00e5	5.31e5	nan	nan	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	25	19	**1**	**1**	***10e+0/1e5***	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	21	**2.8**	***35e+0/1e6***	.	.	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	25	7.3	***81e+0/2e3***	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*46e+4/900*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1.4**	12	***72e+0/1e4***	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**6.9**	1108	***96e+0/3e5***	.	.	.	.	.	.	.	DASA [17]
DEPSO	10	17	***10e+1/2e3***	.	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	7.5	**1**	***35e+0/1e6***	.	.	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**4.9**	***38e+0/1e4***	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
(1+1)-ES	20	23274	***15e+1/1e6***	.	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	*99e+3/1e6*	.	.	.	.	.	.	.	.	.	Monte Carlo [3]

Table 156: Running time excess ERT/ERT_{best} on f_{106} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

106 Rosenbrock moderate Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT_{best}/D	17	48	1731	2271	2388	2452	2488	2518	2544	2596	ERT_{best}/D
ALPS-GA	36	60	**38**	**162**	***39e-1/1e5***	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	26	18	*27e+0/1e6*	.	.	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	34	71	*10e+1/2e3*	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*12e+3/4e3*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1.1**	**1**	*28e+0/1e4*	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	5.8	22	**14**	**200**	***73e-2/7e5***	.	.	.	.	.	DASA [17]
DEPSO	15	95	*11e+1/2e3*	.	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	10	6.5	*29e+0/1e6*	.	.	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1.3**	**1.3**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
(1+1)-ES	**1**	**2.2**	8311	*13e+0/1e6*	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	*92e+3/1e6*	.	.	.	.	.	.	.	.	.	Monte Carlo [3]

Table 157: Running time excess ERT/ERT$_{\text{best}}$ on f_{107} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

107 Sphere Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.03	225	14689	68882	93150	96959	1.01e5	1.05e5	1.09e5	1.17e5	ERT$_{\text{best}}$/D
ALPS-GA	**1**	10	***35e+0/1e5***	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.5**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**2.7**	***22e+0/2e3***	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	*29e+1/1e3*	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	*22e+1/1e4*	.	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	*20e+1/2e5*	.	.	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	*19e+1/2e3*	.	.	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**1**	**1**	**8.5**	**2.4**	**2.9**	**3.7**	**3.6**	**3.7**	**3.6**	**3.4**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	657	***17e+1/1e4***	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
(1+1)-ES	**1**	*17e+1/1e6*	.	.	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	**1**	*13e+1/1e6*	.	.	.	.	.	.	.	.	Monte Carlo [3]

Table 158: Running time excess ERT/ERT$_{\text{best}}$ on f_{108} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

108 Sphere unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.03	9637	7.19e5	7.28e6	1.48e7	nan	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**30**	***11e+1/1e5***	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1**	**1**	**1**	***46e-1/1e6***	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	*22e+1/2e3*	.	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	*32e+1/800*	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	*22e+1/1e4*	.	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	*23e+1/2e5*	.	.	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	*31e+1/2e3*	.	.	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**1**	**4.8**	**2.0**	**1.0**	***82e-1/1e6***	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	*29e+1/1e4*	.	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
(1+1)-ES	**1**	*18e+1/1e6*	.	.	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	**1**	*14e+1/1e6*	.	.	.	.	.	.	.	.	Monte Carlo [3]

Table 159: Running time excess ERT/ERT$_{\text{best}}$ on f_{109} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

109 Sphere Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.03	7.7	21	36	63	92	124	156	188	251	ERT$_{\text{best}}$/D
ALPS-GA	**1**	12	14436	*11e+0/1e5*	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	16	**16**	**16**	**15**	**46**	**128**	**136**	**152**	**149**	AMaLGaM IDEA [4]
BayEDAcG	**1**	31	28	**26**	**23**	**46**	*10e-3/2e3*	.	.	.	BayEDAcG [9]
BFGS	**1**	*33e+1/2e3*	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	5.6	387	*87e-1/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	240	*37e+0/2e5*	.	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**4.8**	60	*62e-1/2e3*	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**1**	7.4	**10**	27	87	233	**493**	**431**	**415**	**352**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
(1+1)-ES	**1**	**1.9**	1553	*52e-1/1e6*	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	**1**	*13e+1/1e6*	.	.	.	.	.	.	.	.	Monte Carlo [3]

Table 160: Running time excess ERT/ERT$_{\text{best}}$ on f_{110} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

110 Rosenbrock Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	1761	15341	nan	nan	nan	nan	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	35	***73e+1/1e5***	.	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1.0**	**1**	***38e+0/1e6***	.	.	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	***72e+1/2e3***	.	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*52e+4/500*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	*24e+4/1e4*	.	.	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	*23e+4/2e5*	.	.	.	.	.	.	.	.	.	DASA [17]
DEPSO	*35e+4/2e3*	.	.	.	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**1.3**	**8.9**	***39e+0/1e6***	.	.	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	*40e+3/1e4*	.	.	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
(1+1)-ES	*14e+4/1e6*	.	.	.	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	*92e+3/1e6*	.	.	.	.	.	.	.	.	.	Monte Carlo [3]

Table 161: Running time excess ERT/$\mathrm{ERT}_{\mathrm{best}}$ on f_{111} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

111 Rosenbrock unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
$\mathrm{ERT}_{\mathrm{best}}$/D	16265	2.77e5	nan	nan	nan	nan	nan	nan	nan	nan	$\mathrm{ERT}_{\mathrm{best}}$/D
ALPS-GA	***30e+3/1e5***	.	.	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	***71e+0/1e6***	.	.	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	***21e+3/2e3***	.	.	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	***46e+4/400***	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	***27e+4/1e4***	.	.	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	***24e+4/2e5***	.	.	.	.	.	.	.	.	.	DASA [17]
DEPSO	***44e+4/2e3***	.	.	.	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**7.1**	**2.1**	***59e+0/1e6***	.	.	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	***49e+4/1e4***	.	.	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
(1+1)-ES	***16e+4/1e6***	.	.	.	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	***94e+3/1e6***	.	.	.	.	.	.	.	.	.	Monte Carlo [3]

Table 162: Running time excess ERT/ERT$_{\text{best}}$ on f_{112} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

112 Rosenbrock Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	18	157	4454	6347	6669	6799	6887	6959	7031	7155	ERT$_{\text{best}}$/D
ALPS-GA	33	1814	***11e+1/1e5***	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	27	**5.5**	***21e+0/1e6***	.	.	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	32	13	***89e+0/2e3***	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*51e+4/2e3*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1.2**	16	***63e+0/1e4***	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	5.0	1847	***97e+0/3e5***	.	.	.	.	.	.	.	DASA [17]
DEPSO	15	*24e+1/2e3*	.	.	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	10	**2.4**	***28e+0/1e6***	.	.	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1.2**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
(1+1)-ES	**1**	43	***51e+0/1e6***	.	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	*89e+3/1e6*	.	.	.	.	.	.	.	.	.	Monte Carlo [3]

Table 163: Running time excess ERT/ERT$_{\text{best}}$ on f_{113} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

113 Step-ellipsoid Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	52	2681	34690	1.36e5	1.41e5	1.60e5	1.60e5	1.60e5	1.60e5	1.60e5	ERT$_{\text{best}}$/D
ALPS-GA	**2.1**	**75**	***10e+1/1e5***	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1.9**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	4.0	*18e+1/2e3*	.	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*19e+2/1e3*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	870	*11e+2/1e4*	.	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	3240	*89e+1/2e5*	.	.	.	.	.	.	.	.	DASA [17]
DEPSO	120	*13e+2/2e3*	.	.	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**1**	**1.9**	**4.6**	**2.4**	**2.5**	**2.4**	**2.4**	**2.4**	**2.4**	**2.4**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	59	*51e+1/1e4*	.	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
(1+1)-ES	1929	*72e+1/1e6*	.	.	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	24	*52e+1/1e6*	.	.	.	.	.	.	.	.	Monte Carlo [3]

Table 164: Running time excess ERT/ERT$_{\text{best}}$ on f_{114} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

114 Step-ellipsoid unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	165	65190	2.60e6	nan	nan	nan	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	**2.1**	***50e+1/1e5***	.	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1**	***12e+0/1e6***	.	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	12	***94e+1/2e3***	.	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*19e+2/700*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	434	***13e+2/1e4***	.	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	992	***99e+1/2e5***	.	.	.	.	.	.	.	.	DASA [17]
DEPSO	*20e+2/2e3*	.	.	.	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**10**	**3.2**	**5.7**	***19e+0/1e6***	.	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	*19e+2/1e4*	.	.	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
(1+1)-ES	1239	***74e+1/1e6***	.	.	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	11	***54e+1/1e6***	.	.	.	.	.	.	.	.	Monte Carlo [3]

Table 165: Running time excess ERT/ERT$_{\text{best}}$ on f_{115} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

115 Step-ellipsoid Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	4.4	27	514	4858	9316	10456	10456	10456	10456	10493	ERT$_{\text{best}}$/D
ALPS-GA	8.4	16	*41e+0/1e5*	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	11	**12**	**1.1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	13	25	*25e+0/2e3*	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*17e+2/2e3*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1.1**	475	*10e+1/1e4*	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	6.7	*17e+1/2e5*	.	.	.	.	.	.	.	.	DASA [17]
DEPSO	3.6	24	*59e+0/2e3*	.	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	4.6	**4.8**	**1**	**3.4**	**4.5**	**6.0**	**6.0**	**6.0**	**6.0**	**5.9**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1.1**	**29**	**15**	***31e-1/1e4***	.	.	.	.	IPOP-SEP-CMA-ES [20]
(1+1)-ES	**2.0**	2.62e5	*12e+1/1e6*	.	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	393	*53e+1/1e6*	.	.	.	.	.	.	.	.	Monte Carlo [3]

Table 166: Running time excess ERT/ERT$_{\text{best}}$ on f_{116} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

116 Ellipsoid Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	13071	70044	1.04e5	1.08e5	1.13e5	1.17e5	1.21e5	1.25e5	1.28e5	1.36e5	ERT$_{\text{best}}$/D
ALPS-GA	***65e+2/1e5***	.	.	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	***20e+3/2e3***	.	.	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	***19e+4/500***	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	***93e+3/1e4***	.	.	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	***71e+3/2e5***	.	.	.	.	.	.	.	.	.	DASA [17]
DEPSO	***14e+4/2e3***	.	.	.	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**6.1**	**2.8**	**3.6**	**3.8**	**3.7**	**3.6**	**3.5**	**3.4**	**3.4**	**3.3**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	***52e+3/1e4***	.	.	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
(1+1)-ES	***49e+3/1e6***	.	.	.	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	***37e+3/1e6***	.	.	.	.	.	.	.	.	.	Monte Carlo [3]

Table 167: Running time excess ERT/ERT$_{\text{best}}$ on f_{117} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

117 Ellipsoid unif

Δftarget ERT$_{\text{best}}$/D	1e+03 1.35e5	1e+02 1.42e6	1e+01 4.93e6	1e+00 nan	1e-01 nan	1e-02 nan	1e-03 nan	1e-04 nan	1e-05 nan	1e-07 nan	Δftarget ERT$_{\text{best}}$/D
ALPS-GA	***31e+3/1e5***	.	.	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1**	***90e+0/1e6***	.	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	***58e+3/2e3***	.	.	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	***16e+4/400***	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	***12e+4/1e4***	.	.	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	***82e+3/2e5***	.	.	.	.	.	.	.	.	.	DASA [17]
DEPSO	***18e+4/2e3***	.	.	.	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**3.3**	**1.5**	**3.0**	***13e+1/1e6***	.	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	***14e+4/1e4***	.	.	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
(1+1)-ES	***50e+3/1e6***	.	.	.	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	***37e+3/1e6***	.	.	.	.	.	.	.	.	.	Monte Carlo [3]

Table 168: Running time excess ERT/ERT$_{\text{best}}$ on f_{118} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

118 Ellipsoid Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	180	363	980	1197	2046	2406	2717	2918	3113	3289	ERT$_{\text{best}}$/D
ALPS-GA	27	*38e+1/1e5*	.	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**2.7**	**2.1**	**1**	**1**	**2.0**	**3.2**	**10**	**16**	**16**	**16**	AMaLGaM IDEA [4]
BayEDAcG	*28e+2/2e3*	.	.	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	*16e+4/2e3*	.	.	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	6.0	*46e+1/1e4*	.	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	14914	*13e+2/4e5*	.	.	.	.	.	.	.	.	DASA [17]
DEPSO	*24e+2/2e3*	.	.	.	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**1.2**	**1**	**1.8**	**6.5**	**7.3**	**18**	**23**	**26**	**24**	**23**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1.6**	**1.1**	**1.4**	**1**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
(1+1)-ES	6583	*96e+1/1e6*	.	.	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	*38e+3/1e6*	.	.	.	.	.	.	.	.	.	Monte Carlo [3]

Table 169: Running time excess ERT/ERT$_{\text{best}}$ on f_{119} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

119 Sum of different powers Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.03	1.3	2341	53151	95066	1.17e5	2.07e5	2.57e5	3.02e5	4.14e5	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.8**	22	***88e-1/1e5***	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**2.2**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1.1**	**1.2**	**1**	***93e-1/2e3***	.	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	667	*95e+0/1e3*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	185	*51e+0/1e4*	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	688	*43e+0/2e5*	.	.	.	.	.	.	.	DASA [17]
DEPSO	**1.1**	8.6	*35e+0/2e3*	.	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**1**	**2.7**	**2.5**	**3.3**	**3.5**	**3.1**	**1.8**	**1.5**	**1.3**	**1.2**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	4.1	4.0	*26e+0/1e4*	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
(1+1)-ES	**1.7**	72	*36e+0/1e6*	.	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	**1**	**1.2**	*28e+0/1e6*	.	.	.	.	.	.	.	Monte Carlo [3]

Table 170: Running time excess ERT/ERT$_{\text{best}}$ on f_{120} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

120 Sum of different powers unif

Δftarget ERT$_{\text{best}}$/D	1e+03 0.03	1e+02 1.0	1e+01 67582	1e+00 nan	1e-01 nan	1e-02 nan	1e-03 nan	1e-04 nan	1e-05 nan	1e-07 nan	Δftarget ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	***23e+0/1e5***	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**2.8**	**1**	***30e-1/1e6***	.	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.2**	***53e+0/2e3***	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	3.7	553	***82e+0/800***	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	404	***61e+0/1e4***	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	1229	***47e+0/2e5***	.	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	1339	***95e+0/2e3***	.	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**1**	5.4	**3.9**	***48e-1/1e6***	.	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	1538	***61e+0/1e4***	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
(1+1)-ES	**1**	221	***39e+0/1e6***	.	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	**1**	**1.9**	***29e+0/1e6***	.	.	.	.	.	.	.	Monte Carlo [3]

Table 171: Running time excess ERT/ERT$_{\text{best}}$ on f_{121} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

121 Sum of different powers Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.03	1.4	18	43	84	205	690	1429	2435	5045	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	1644	*84e-1/1e5*	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.8**	**14**	**13**	**37**	**131**	**72**	**35**	**21**	**11**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**2.3**	33	35	*38e-2/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	1603	*92e+0/2e3*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1.9**	2431	*14e+0/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	35	*27e+0/2e5*	.	.	.	.	.	.	.	DASA [17]
DEPSO	**1.1**	3.4	28	*54e-1/2e3*	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**1**	**1.5**	**8.3**	**28**	**100**	**309**	**128**	**103**	**113**	**65**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**2.2**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
(1+1)-ES	**1**	**2.7**	48003	*95e-1/1e6*	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	**1.1**	**1.2**	*28e+0/1e6*	.	.	.	.	.	.	.	Monte Carlo [3]

Table 172: Running time excess ERT/ERT$_{\text{best}}$ on f_{122} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

122 Schaffer F7 Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.03	0.03	123	1.99e5	3.96e5	5.96e5	9.37e5	1.45e6	1.50e7	nan	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	7.9	***58e-1/1e5***	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.3**	**1.6**	**1**	**1**	**1**	**1**	**1.1**	***11e-5/1e6***	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**3.1**	***59e-1/2e3***	.	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	37	*18e+0/1e3*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1.8**	1155	***13e+0/1e4***	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	11	*12e+0/2e5*	.	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1.1**	53	***12e+0/2e3***	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**1**	**1**	**1**	**1.8**	**2.4**	**1.7**	**1.1**	**1**	**1**	***49e-6/1e6***	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	114	***99e-1/1e4***	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
(1+1)-ES	**1**	60	14608	***10e+0/1e6***	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	**1**	**1.2**	1196	***88e-1/1e6***	.	.	.	.	.	.	Monte Carlo [3]

Table 173: Running time excess ERT/ERT$_{\text{best}}$ on f_{123} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

123 Schaffer F7 unif

Δftarget ERT$_{\text{best}}$/D	1e+03 0.03	1e+02 0.03	1e+01 331	1e+00 nan	1e-01 nan	1e-02 nan	1e-03 nan	1e-04 nan	1e-05 nan	1e-07 nan	Δftarget ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.5**	**20**	***82e-1/1e5***	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.3**	**1**	***43e-1/1e6***	.	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.1**	*13e+0/2e3*	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	28	*18e+0/900*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	434	***14e+0/1e4***	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	10	*12e+0/2e5*	.	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1.1**	*20e+0/2e3*	.	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**1**	**1.1**	**11**	***46e-1/1e6***	.	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	*13e+0/1e4*	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
(1+1)-ES	**1**	34	13988	***11e+0/1e6***	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	**1**	**1.2**	473	***88e-1/1e6***	.	.	.	.	.	.	Monte Carlo [3]

Table 174: Running time excess ERT/ERT$_{\text{best}}$ on f_{124} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

124 Schaffer F7 Cauchy

Δftarget ERT$_{\text{best}}$/D	1e+03 0.03	1e+02 0.03	1e+01 14	1e+00 1036	1e-01 7340	1e-02 10114	1e-03 22464	1e-04 33164	1e-05 38223	1e-07 56883	Δftarget ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1.2**	13	*59e-1/1e5*	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1.1**	10	**1**	**3.9**	**3.0**	**1.4**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1.1**	20	3.8	*11e-1/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	184	*17e+0/2e3*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	497	*95e-1/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1.3**	1.62e5	*11e+0/2e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1.3**	**8.2**	*58e-1/2e3*	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**1**	**1.3**	**4.6**	**2.6**	**12**	**17**	**7.9**	**5.4**	**4.8**	**3.3**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	3.1	**1**	**2.4**	**1**	**1**	**1**	***16e-4/1e4***	.	.	IPOP-SEP-CMA-ES [20]
(1+1)-ES	**1**	4.2	4639	*84e-1/1e6*	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	**1**	**1.4**	12304	*89e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]

Table 175: Running time excess ERT/ERT$_{\text{best}}$ on f_{125} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

125 Griewank-Rosenbrock Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.03	0.03	0.03	115	nan	nan	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1.2**	**1.8**	***64e-2/1e5***	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1**	**1.4**	***44e-2/1e6***	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.1**	**2.0**	***69e-2/2e3***	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	**1**	*28e-1/2e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1**	*15e-1/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	7.1	*20e-1/2e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	**1**	244	***12e-1/2e3***	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**1**	**1**	**1**	**1**	***44e-2/1e6***	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1**	1279	***11e-1/1e4***	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
(1+1)-ES	**1**	**1**	3.5	*15e-1/1e6*	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	**1**	**1**	**1**	*14e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]

Table 176: Running time excess ERT/ERT$_{\text{best}}$ on f_{126} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

126 Griewank-Rosenbrock unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.03	0.03	0.03	218	nan	nan	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1.1**	**10**	***81e-2/1e5***	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1.1**	**1**	***50e-2/1e6***	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.1**	*12e-1/2e3*	.	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	28	*29e-1/1e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1**	*16e-1/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	**1**	*20e-1/2e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	**1.1**	*23e-1/2e3*	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**1**	**1**	**1**	**4.3**	***51e-2/1e6***	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1**	*17e-1/1e4*	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
(1+1)-ES	**1**	**1**	**1**	*16e-1/1e6*	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	**1**	**1**	**1.1**	*14e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]

Table 177: Running time excess ERT/ERT$_{\text{best}}$ on f_{127} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

127 Griewank-Rosenbrock Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.03	0.03	0.03	19	44721	2.29e6	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	**1.1**	6.6	*70e-2/1e5*	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1**	**6.6**	**2.3**	**6.4**	***19e-3/1e6***	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**1.2**	12	*59e-2/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	302	*28e-1/2e3*	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	**1**	*13e-1/1e4*	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	**1**	*20e-1/2e5*	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	**1**	49	*95e-2/2e3*	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**1**	**1**	**1.2**	**3.7**	**3.5**	**1**	***11e-3/1e6***	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1**	**1**	**1**	***16e-2/1e4***	.	.	.	.	IPOP-SEP-CMA-ES [20]
(1+1)-ES	**1**	**1**	**1**	7.95e5	*11e-1/1e6*	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	**1**	**1**	**1.1**	*15e-1/1e6*	.	.	.	.	.	.	Monte Carlo [3]

Table 178: Running time excess ERT/ERT$_{\text{best}}$ on f_{128} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

128 Gallagher Gauss

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.03	0.03	1.06e6	3.25e6	6.76e6	6.76e6	6.77e6	6.77e6	6.77e6	6.78e6	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	***70e+0/1e5***	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	***73e+0/2e3***	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	***84e+0/1e3***	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	***81e+0/1e4***	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	***79e+0/2e5***	.	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	***80e+0/2e3***	.	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**1**	**1**	**3.1**	**1.4**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	***82e+0/1e4***	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
(1+1)-ES	**1**	**1**	***74e+0/1e6***	.	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	**1**	**1**	***68e+0/1e6***	.	.	.	.	.	.	.	Monte Carlo [3]

Table 179: Running time excess ERT/ERT$_{\text{best}}$ on f_{129} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

129 Gallagher unif

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.03	0.03	nan	nan	nan	nan	nan	nan	nan	nan	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	***70e+0/1e5***	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	***66e+0/1e6***	.	.	.	.	.	.	.	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	***81e+0/2e3***	.	.	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	***84e+0/800***	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	***80e+0/1e4***	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	***79e+0/2e5***	.	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	***84e+0/2e3***	.	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**1**	**1**	***66e+0/1e6***	.	.	.	.	.	.	.	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	***84e+0/1e4***	.	.	.	.	.	.	.	IPOP-SEP-CMA-ES [20]
(1+1)-ES	**1**	**1**	***74e+0/1e6***	.	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	**1**	**1**	***68e+0/1e6***	.	.	.	.	.	.	.	Monte Carlo [3]

Table 180: Running time excess ERT/ERT$_{\text{best}}$ on f_{130} in **40-D**, in italics is given the median final function value and the median number of function evaluations to reach this value divided by dimension

130 Gallagher Cauchy

Δftarget	1e+03	1e+02	1e+01	1e+00	1e-01	1e-02	1e-03	1e-04	1e-05	1e-07	Δftarget
ERT$_{\text{best}}$/D	0.03	0.03	317	6925	42118	42165	42224	42282	42361	42474	ERT$_{\text{best}}$/D
ALPS-GA	**1**	**1**	*42e+0/1e5*	.	.	.	.	.	.	.	ALPS-GA [14]
AMaLGaM IDEA	**1**	**1**	7.5	101	**95**	**95**	**95**	**95**	**95**	**95**	AMaLGaM IDEA [4]
BayEDAcG	**1**	**1**	**3.8**	**1**	*17e-1/2e3*	.	.	.	.	.	BayEDAcG [9]
BFGS	**1**	**1**	*83e+0/2e3*	.	.	.	.	.	.	.	BFGS [21]
(1+1)-CMA-ES	**1**	**1**	*47e+0/1e4*	.	.	.	.	.	.	.	(1+1)-CMA-ES [2]
DASA	**1**	**1**	*75e+0/2e5*	.	.	.	.	.	.	.	DASA [17]
DEPSO	**1**	**1**	12	*20e+0/2e3*	.	.	.	.	.	.	DEPSO [11]
iAMaLGaM IDEA	**1**	**1**	**3.4**	**66**	**40**	**50**	**68**	**70**	**97**	**97**	iAMaLGaM IDEA [4]
IPOP-SEP-CMA-ES	**1**	**1**	**1**	**1.6**	**1**	**1**	**1**	**1**	**1**	**1**	IPOP-SEP-CMA-ES [20]
(1+1)-ES	**1**	**1**	21720	*20e+0/1e6*	.	.	.	.	.	.	(1+1)-ES [1]
Monte Carlo	**1**	**1**	*68e+0/1e6*	.	.	.	.	.	.	.	Monte Carlo [3]

References

[1] Anne Auger. Benchmarking the (1+1)-ES with one-fifth success rule on the BBOB-2009 noisy testbed. In Rothlauf [23], pages 2453–2458.

[2] Anne Auger and Nikolaus Hansen. Benchmarking the (1+1)-CMA-ES on the BBOB-2009 noisy testbed. In Rothlauf [23], pages 2467–2472.

[3] Anne Auger and Raymond Ros. Benchmarking the pure random search on the BBOB-2009 noisy testbed. In Rothlauf [23], pages 2485–2490.

[4] Peter A. N. Bosman, Jörn Grahl, and Dirk Thierens. AMaLGaM IDEAs in noisy black-box optimization benchmarking. In Rothlauf [23], pages 2351–2358.

[5] Mohammed El-Abd and Mohamed S. Kamel. Black-box optimization benchmarking for noiseless function testbed using an EDA and PSO hybrid. In Rothlauf [23], pages 2263–2268.

[6] Mohammed El-Abd and Mohamed S. Kamel. Black-box optimization benchmarking for noiseless function testbed using particle swarm optimization. In Rothlauf [23], pages 2269–2274.

[7] Mohammed El-Abd and Mohamed S. Kamel. Black-box optimization benchmarking for noiseless function testbed using PSO_Bounds. In Rothlauf [23], pages 2275–2280.

[8] S. Finck, N. Hansen, R. Ros, and A. Auger. Real-parameter black-box optimization benchmarking 2009: Presentation of the noisy functions. Technical Report 2009/21, Research Center PPE, 2009.

[9] Marcus R. Gallagher. Black-box optimization benchmarking: results for the BayEDAcG algorithm on the noisy function testbed. In Rothlauf [23], pages 2383–2388.

[10] Carlos García-Martínez and Manuel Lozano. A continuous variable neighbourhood search based on specialised EAs: application to the noisy BBO-benchmark 2009 testbed. In Rothlauf [23], pages 2367–2374.

[11] José García-Nieto, Enrique Alba, and Javier Apolloni. Particle swarm hybridized with differential evolution: black box optimization benchmarking for noisy functions. In Rothlauf [23], pages 2343–2350.

[12] N. Hansen, A. Auger, S. Finck, and R. Ros. Real-parameter black-box optimization benchmarking 2009: Experimental setup. Technical Report RR-6828, INRIA, 2009.

[13] N. Hansen, S. Finck, R. Ros, and A. Auger. Real-parameter black-box optimization benchmarking 2009: Noisy functions definitions. Technical Report RR-6869, INRIA, 2009.

[14] Gregory S. Hornby. The age-layered population structure (ALPS) evolutionary algorithm. http://coco.gforge.inria.fr/doku.php?id=bbob-2009-results, July 2009. Noisy testbed.

[15] Waltraud Huyer and Arnold Neumaier. Benchmarking of MCS on the noisy function testbed. http://www.mat.univie.ac.at/~neum/papers.html, 2009. P. 988.

[16] Waltraud Huyer and Arnold Neumaier. Benchmarking of SNOBFIT on the noisy function testbed. http://www.mat.univie.ac.at/~neum/papers.html, 2009. P. 987.

[17] Peter Korosec and Jurij Silc. A stigmergy-based algorithm for black-box optimization: noisy function testbed. In Rothlauf [23], pages 2375–2382.

[18] Daniel Molina, Manuel Lozano, and Francisco Herrera. A memetic algorithm using local search chaining for black-box optimization benchmarking 2009 for noisy functions. In Rothlauf [23], pages 2359–2366.

[19] László Pál, Tibor Csendes, Mihály Csaba Markót, and Arnold Neumaier. BBO-benchmarking of the GLOBAL method for the noisy function testbed. http://www.mat.univie.ac.at/~neum/papers.html, 2009. P. 985.

[20] Raymond Ros. Benchmarking sep-CMA-ES on the BBOB-2009 noisy testbed. In Rothlauf [23], pages 2441–2446.

[21] Raymond Ros. Benchmarking the BFGS algorithm on the BBOB-2009 noisy testbed. In Rothlauf [23], pages 2415–2420.

[22] Raymond Ros. Benchmarking the NEWUOA on the BBOB-2009 noisy testbed. In Rothlauf [23], pages 2429–2434.

[23] Franz Rothlauf, editor. *Genetic and Evolutionary Computation Conference, GECCO 2009, Proceedings, Montreal, Québec, Canada, July 8-12, 2009, Companion Material*. ACM, 2009.

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